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ABSTRACT

This report analyzes and synthesizes the results of research studies on teacher competence and teacher effectiveness. Its primary purpose is to provide the teacher educator with access for the findings of this research. The dynamics of teacher effectiveness are illustrated by 43 tables each dealing with a different teacher behavior as observed in the classroom. Subjects examined are: (1) working with groups; (2) classroom management; (3) time allotment; (4) questioning techniques; (5) teacher reactions; (6) behavior problems; (7) teaching techniques; (8) working with individual pupils. An extended bibliography is appended. (JD)

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Teacher Competence and Teacher Effectiveness

A Review of Process-Product Research

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The American Association of Colleges for Teacher Education

TEACHER COMPETENCE AND TEACHER EFFECTIVENESS

A Review of Process-Product Research

by

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FOREWORD

The American Association of Colleges for Teacher Education (AACTE) is pleased to publish this paper because of its relevance to teacher education and to the education profession generally. This monograph addresses one of the critical questions involved in designing and implementing pre- and in-service teacher education programs, namely: What does research say about teacher competence and teacher effectiveness? The answer to that question will be particularly useful for those teacher educators who are reexamining the objectives of their present preparation programs, those evaluating the effectiveness of their programs, and those experimenting with performance/competency-based teacher education programs.

But what research says about teacher competence and teacher effectiveness is of interest to and has critical implications for other educators as well: classroom teachers, teacher organizations, teacher center directors, school administrators, state departments of education, professional standards commissions, the U. S. Office of Education, educational researchers, school board members, and the general public. Because of the nature of the topic and the way in which it is addressed, we believe that this monograph is a significant addition to educational literature.

The author, Dr. Donald M. Medley, has brought to the task of analyzing and synthesizing the results of research studies on teacher competence and teacher effectiveness a rich background of experience in research methodology. He is well known and respected in the field of educational research. His contribution in this work includes not only the substantive findings, but a unique methodology for carrying out this task.

Dr. Medley was commissioned by AACTE's Committee on Performance-Based Teacher Education to develop this monograph. While the study was generated under the auspices of the PBTE project, the Committee from the beginning was well aware that the results would have implications far beyond the design and implementation of performance/competency-based teacher education programs.

The study, which is endorsed by the Committee, was conducted under its general supervision. To augment its own expertise in the area of educational research, the Committee created a researchers' panel to work with Dr. Medley during the course of the study. Members of this panel are identified on the inside cover of this monograph.

The contributions of the researchers' panel, as acknowledged by the author, were especially helpful in developing the final product. Most of their comments (see Appendix C) were highly complimentary. Some of the reviewers' suggestions were incorporated into the study. Some of their objections would evaporate if the reviewers' accepted our purpose--to present interim findings that can be used to improve teacher education *now* while we wait for the researchers to produce definitive results. A number of other objections are disarmed by the results obtained. Meaningful, dependable, and consistent findings were uncovered, and more of them than these objections, if valid, would lead us to expect. The author must have done something right.

AACTE acknowledges with appreciation the role of the National Center for Improvement of Educational Systems (NCIES) of the U. S. Office of Education in the PBTE Project. Its financial support (provided through the Interstate

Certification Project of the New York State Department of Education) as well as its professional stimulation, particularly that of Allen Schmieder, are major contributions to the Committee's work. The Association also acknowledges the significant contribution of the author and his support staff, and that of the members of the Committee and researchers' panel. Special recognition is due Lorrin Kennamer, PBTE committee chairman, Shirley Bonneville of the project staff, and Annette MacKinnon, technical editor, for their contributions to the development of this publication.

EDUARD C. POMEROY

Executive Director, AACTE

KARL MASSANARI

Associate Director, AACTE

and Director, PBTE Project

DEDICATION

With appreciation, AACTE dedicates this monograph to

G I L B E R T F. S H E A R R O N

Former Professor and Chairman

Division of Elementary Education

College of Education

University of Georgia

who suffered a fatal heart attack on March 14, 1977.

Dr. Shearron was associated closely with AACTE's PBTE Project since its inception. He served as a committee member, and provided valuable assistance in conceptualizing the design of leadership training institutes and in their implementation. He was one of the architects of the University of Georgia Elementary Education Model in the late 60's. Since that time he provided leadership in experimenting with a competency-based preparation program for elementary teachers. He provided wise counsel to AACTE's Committee and to institutions of higher education regarding the potential and pitfalls of implementing competency-based teacher education programs.

Dr. Shearron's professional life was dedicated to the improvement of education for children through experimenting with more effective ways to prepare school personnel. The education profession will miss his creative leadership, and those who knew him as Gil will miss the inspiration of working with him personally.

AUTHOR'S ACKNOWLEDGEMENTS

Preparation of this paper involved considerable time and efforts of a great many people. I would like to offer them my particular acknowledgements and thanks. To the committee for giving me just enough time and support to do it, but not enough to overdo it. To the researchers whose findings I have appropriated, with apologies for any violence I have committed in the cause of simplification; as well as to those researchers whose findings I have not included (for reasons given below). To the members of the review panel and others whose letters and comments appear as Appendix C. To Ned Flanders, Robert Houston, and Nathaniel Gage for wise and useful suggestions; and especially to Barak Rosenshine for the detailed and pertinent criticism only he can give. To my wife Betty who assembled the bibliography. To the graduate students who did the hard work, especially to Nenette Lara, Betsy Miller, Dick Nicholson, and Jim Vermillion. To Phyllis Virunurm, who struggled valiantly to maintain some sort of order in the process, and typed everything. And finally to Annette MacKinnon who was very helpful in providing technical assistance in editing the manuscript for publication.

- D. M.

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INTRODUCTION

It is the primary purpose of this report to provide the teacher educator with access to the meaningful findings of research in teacher effectiveness.

In the last few years, the advent of a major innovation in teacher education--performance-based teacher education--has made the importance of these findings--and of access to them--more apparent than ever before.

The central notion behind performance-based teacher education is that decisions about a teacher's career--about passage through preservice training, certification, promotion, recertification, and so on--should be based on demonstrated competency to perform in ways that an effective teacher performs. Implementation of this idea requires that the nature of effective teacher performance be specified in sufficient detail. Then it is possible to measure to what degree, and in what ways, the performance of any individual teacher resembles effective performance.

Knowledge of Teacher Effectiveness

Efforts to develop performance-based programs both for educating and certifying teachers have made it painfully clear just how inadequate the base is for what we know today about the dynamics of teacher effectiveness. These efforts have also demonstrated how weak the connection is between research in teacher effectiveness and the teacher education curriculum.

There seem to be two major reasons why this is so. One has to do with the quality and quantity of research findings to date; the other has to do with access to these findings.

First, research in teacher effectiveness is much more difficult and expensive to do well than research in most other aspects of the educational process. Technical difficulties are formidable and, until recently, were not even suspected by most researchers in the area. For this reason, many of the findings reported were inaccurate and, therefore, inconsistent with each other. Recent research has been better designed and better supported; it has also greatly increased both the sheer amount of results reported in the literature and the difficulty of access by anyone unable or unwilling to work full time on the problem.

Second, whenever teacher educators attempt to sift these findings they find the task so difficult and time consuming that they can scarcely be blamed if they abandon it. The literature of the subject is vast and inaccessible, and much of it is difficult to comprehend and evaluate.

A number of sound scholarly reviews of this literature have appeared in recent years (cf. Rosenshine, 1971, 1976; Rosenshine and Furst, 1971, 1973; Dunkin and Biddle, 1974; Brophy and Evertson, 1976*). These are invaluable; but the reader comes away with the feeling (not really justified) that there has been access, not to the research itself, but to a synthesis or interpretation

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*See References following the text.

of that research. This leaves the reader at the mercy of what Dunkin and Biddle (op. cit.) refer to as the "commitment" of the reviewer.

In this project we have made a strong effort to put the reader in direct contact with the research. We have canvassed the literature and culled the most significant findings from it, without attempting to select or interpret them or to reconcile them with each other. We have then presented them in a series of tables in a particularly simple format.

Interpretation of Findings

Readers of this report are invited to examine the process-product correlations presented in Tables 3-43 and draw their own conclusions. These tables were designed to communicate the most clearly established facts about effective teaching and only those facts. They constitute what we regard as the principal product of our investigation.

In reading the pages to follow, it is important to bear in mind certain limitations; the procedures we followed made an effort to reduce the complexities in many thousands of correlations to something both accurate and comprehensible.

First, we have presented only the strongest and most dependable findings, ignoring both small correlations that are statistically significant, and larger correlations that are not. The fact that a relationship is not reported should *not* be taken as evidence that it does not exist, or even as indicating that there is no research evidence that it exists. Absence of a relationship from Tables 3-43 means only that its existence has not been clearly established as far as we can discover. If a relationship is reported in the tables, there is strong evidence that it does exist. The reader whose questions are not answered in these tables is urged to consult the original studies or the comprehensive reviews cited previously for more details.

The second limitation we would like to emphasize has to do with generalizability. For reasons mainly connected with the funding strategy of the U. S. Office of Education, most of the research summarized here was done in one segment of the school population--in classes of Grade III or below in which most of the pupils come from homes of low socioeconomic status. To what extent these findings apply to pupils with other backgrounds or in other grades is not known. What evidence we have about pupils of high socioeconomic status and pupils in the higher grades indicates that results from one group do not always apply to another.

Dangers of Misinterpretation

A secondary product of this investigation is our own reading of some of the conclusions these facts support. If these conclusions seem incorrect, the reader can go to the facts and draw others. The only rule that one should follow is what we tried to observe: a valid interpretation must fit *all* the facts. Anyone who selects some facts and rejects others on any basis whatsoever will reach conclusions which cannot be said to be based on the facts, thereby defeating the whole purpose of the enterprise.

In education especially, no more serious obstacle to the advancement of knowledge exists than the universal tendency we have to embrace and remember research findings that fit our expectations, and to reject and forget those that do not. Educators who do not frequently question and alter their beliefs to suit research findings should suspect themselves of impeding rather than aiding progress in the field.

Particularly vulnerable to misinterpretation are the suggestive findings reported herein about possible differences in optimal strategy for teaching primary grade pupils from low and high socioeconomic backgrounds. Most of us have strong convictions about these matters. One group, the group opposed to classroom integration, will be inclined to overinterpret these findings, losing sight of their tentative nature (they come from a single study done in a small number of classrooms in a single city) because the results agree with their biases. Another group, those who favor integration, will be inclined to undervalue the results, concluding that they are incorrect because they do not agree with their biases.

Neither group will advance toward the solution of the problem so long as they follow this practice of evaluating data on the basis of the conclusions reached rather than on the basis of their quality. As far as they go, these data do indicate that optimum learning in the two SES groups requires quite different teaching strategies. What educators must do is to interpret these results in combination with all other evidence available, and if the evidence is not strong enough either to substantiate or to discredit the conclusion, to keep an open mind and press for more research.

Another of the unavoidable risks that attends the publication of research findings is that readers with preconceived attitudes and various axes to grind will misinterpret these findings to suit their own ends. To prevent distortion of research findings, to frustrate those who quote out of context or even misquote the findings, a researcher would be forced to withhold publication of the facts entirely. In this case, the cure would be worse than the disease. At present, while we do not have enough facts, it is still important to disseminate what facts there are and so reduce our ignorance.

Waiting for Definitive Results Before Doing Anything

This is a strategy that appeals to some because it sounds very logical. The argument seems to be that if you don't do anything, you can't do any harm. Since we do not yet have a full and complete understanding of the dynamics of effective teaching, we are expected to ignore the imperfect knowledge that we do possess and do nothing that requires such knowledge.

How fortunate it is for the human race that at least some of our ancestors did not subscribe to this position. If Columbus had waited until he had a complete and accurate map of the world before setting sail, his little fleet would still be sitting in Genoa.

Very few decisions worth making can be put off until there is adequate information to base them on. In medicine--and poker, most actions must be taken, most decisions made, on insufficient data. Patients die, and money is lost, because action is taken when data are inadequate--but more patients and more money would be lost if no action were taken at all.

So too, educators must make decisions everyday, regardless of the availability of hard evidence on which to base them. With this need in mind, we have proceeded.

We believe that after reading this report and studying the findings presented, the reader will agree that no serious student of teaching can afford to be ignorant of the findings produced by research in teacher effectiveness.

PROCEDURE

The basic bibliography of this study consisted of 289 studies* which purported to shed light on the question, "How does the behavior of effective teachers differ from that of ineffective teachers?" These studies were the survivors of a weeding-out process from an original list of 732 items. Most of the 445 rejected items were rejected because they reported no original research; some were reviews of research; others theoretical, philosophical, or opinionated discussions (from the armchair) of what a good teacher ought to do.

The remaining 289 items were examined for empirically obtained relationships between how a teacher behaves and how much the pupils learn from him or her, commonly called *process-product relationships*. Four criteria were used in deciding whether or not a reported relationship should be included in this review. Only those which met all four criteria were included. Briefly, the criteria were:

1. The study from which a relationship came had to be designed so that the relationship was generalizable to some population of teachers larger than the sample studied.

2. The relationship had to be both reliable enough to be statistically significant and large enough to be practically significant.

3. The measure of teacher effectiveness had to be based on long-term pupil gains in achievement areas recognized as important goals of education.

4. The process measure had to specify the behaviors exhibited in such a way that they could be reproduced as desired.

By the time we had applied these criteria to the thousands of reported relationships between teacher behaviors and pupil learning reported in the literature, the number of relationships which survived was 613; and these 613 correlations all came from just 14 of the 289 studies. Since our standards turned out to be so severe in their effect, it seems appropriate to discuss them further.

Rationale of the Study

All four criteria proceed logically from a point of view adopted in this study which is at variance with that underlying most of the research reviewed. This viewpoint may be described briefly as follows:

The ultimate base of teacher education curriculum must be a thorough understanding of the dynamics of effective teaching--of what a teacher must

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*See Appendix B, Bibliography.

know, and be, and do, in order to provide the greatest possible assistance to pupils in their efforts to achieve the goals of education. Such understanding depends on the establishment of cause-and-effect relationships between teacher behavior and pupil learning. Only when we know *why* a teacher is effective--as well as *how*--can we decide how best to train teachers.

The recognized purpose of research in teacher effectiveness is to develop such an understanding by discovering the cause-and-effect relationships from which this understanding may be derived. Teacher education cannot become a fully rational and knowledge-based enterprise until such an understanding has been developed to a degree far beyond what exists at present.

What is the proper course of action for the teacher educator to follow while waiting for the researcher to develop this knowledge bit by bit? Should there be a moratorium on teacher education until the research catches up?

Obviously not; the schools of this country need teachers, and this need must be met by programs designed to give the prospective teacher all the help possible. These programs are based on the judgment and intuition or cumulative wisdom of lifelong students of teaching. There is little doubt that they do a lot to improve teaching. There is less doubt that they could do a lot more if the research base were adequate.

Are there interim findings of the research that can help teacher educators do a better job--or must we wait until the researcher is satisfied that the findings are definitive before touching them? This project was undertaken under the assumption that interim results can be useful. The nature of the research is such that it generates information that is currently useful to teacher educators as is, no matter where the researchers are in their continuing search for cause-and-effect relationships between teacher behavior and pupil gain. Because the researchers collect their data by observing real teachers in real classrooms and measuring what real pupils learn, what they observe can be useful today.

Suppose, then, that we forget about the cause-and-effect inferences the researchers worry about and examine their findings for information about competent teacher performance. Suppose we examine them to see what they tell us about how the day-to-day practice of competent teachers differs from the day-to-day practice of less competent teachers. Does it not seem reasonable to expect that a novice teacher can benefit from learning the best current practices of competent teachers? What techniques and strategies are more likely to work for the novice on the job than those techniques and strategies that work best for other teachers? This is the point of view we have used in this survey of the literature--that process-product research can tell us quite a lot about how competent and less competent teachers differ in their classroom behavior, even though we may not know exactly why.

A strong relationship between a behavior variable and a measure of teacher effectiveness need not be regarded as evidence that the observed behavior caused the measured effect. Instead, we shall use the measure of effectiveness as an indicator of teacher competence, inferring that teachers who are effective are more competent on the average than teachers who are ineffective. The distinction between *competent* and *effective* implied in this statement is important and yet easy to forget. Competence has to do with how a teacher teaches and is measured in terms of the teacher's behavior;

how effective a teacher is is measured in terms of pupil learning. In other words, an effective teacher is always competent, but a competent teacher may not always be effective, for a multitude of reasons.

We shall view the behavior of the teacher as an *effect* rather than a cause, assuming that the competent teacher behaves in a certain way *because he or she is competent*. A strong relationship between teacher effectiveness and a particular behavior will be interpreted as indicating that such a behavior characterizes competent teachers, and therefore may deserve to be called a *competency*.

Let us now examine, one by one, the criteria used in selecting relationships to be reported here.

Criterion I. A Relationship That Is Generalizable

The most important criterion we have used in deciding whether a relationship should be reported or not has to do with the design of the study from which it comes. In brief, the study should be designed so that the results may legitimately be generalized to teachers other than those in the sample studied.

Many of the studies that we examined were "methods experiments" in which one or more teachers taught the same material to two or more groups of pupils by two or more different methods, and the effects on pupils were examined to see whether the methods used affected the outcome. Such experiments are almost invariably analyzed in such a way that the findings generalize to other pupils taught by the same teachers, but not to other teachers. If the results of such experiments are to be generalized to other teachers, it must be assumed that there is no interaction between methods and teachers--that the method effect is the same for all teachers. This assumption is almost always false; unless it is shown to be true, the findings of the experiment tell us nothing about teacher effectiveness.

Most of the "process-product" studies--studies in which samples of teachers were observed and their behaviors were correlated with measures of mean gains in their classrooms--met this criterion automatically. One methods experiment, Project CRAFT (see Appendix A), was found which was designed to yield results generalizable to other teachers; it is the only one which met all criteria for inclusion in this report.

Criterion II. A Strong and Reliable Relationship

Before the development of a given competency (behavior) is adopted as a program objective, there should be strong evidence that the effectiveness of a teacher who acquires that competency will increase. Direct evidence of this is obtainable only by adopting the competency as a program objective on an experimental basis and evaluating the consequences. Meanwhile, the magnitude of the relationship between the competency and pupil learning as estimated in a process-product study provides the best evidence available about which competencies should be so tested. The stronger the relationship, the stronger the evidence the competency will be useful to the teacher. How strong should such a relationship be?

We have somewhat arbitrarily chosen a relationship equivalent to a linear correlation of .39 as the minimum that will be reported. A correlation of this magnitude indicates an overlap of 15% in the variances of the two measures involved. It is of the same order of magnitude as, for example, the correlation usually found between aptitude scores and college grades. Despite recent criticism of abuses of such scores, admissions offices have found them useful. A correlation of .39 between any test and a criterion is regarded as acceptable evidence of validity in general practice. We have therefore reported no correlations below .39 in Tables 3-43.

In addition, we have reported no relationship, whatever its magnitude, unless it is statistically significant at the 5% level. This means, of course, that the risk that a relationship due to chance (one which would not be expected to recur in a different sample of teachers from the same population) would be reported in our tables is not greater than 5%.

When the same behavior (or similar ones) correlates in the same way with the same kind of effectiveness measure in two or more studies, the risk that both are chance results becomes much smaller; such a relationship becomes as near a sure thing as we are ever likely to get. The identification of such instances is an important goal of this investigation.

In the studies which involved larger samples of teachers, there were correlations that were statistically significant, but smaller than .39; in the studies which used smaller samples of teachers, there were correlations greater than .39 which were not statistically significant. None of these was reported.

So stringent a criterion may seem likely to result in our overlooking many relationships that really exist. The danger may be smaller than it appears at first. Among the thousands of correlations run in all of these studies, most relationships of any size have had several chances to show up. Lowering our criterion would admit many more unreliable and contradictory findings, and very few important ones that would otherwise have been missed.

When two inconsistent relationships are reported in this study--that is, when a pair of relationships that should agree (because both involve similar behaviors and similar outcomes) do not agree, the contradiction is almost certain to be a real one. Since such pairs will usually come from different studies done in different teacher populations, they may contain important information about the effects of context on these relationships. On the other hand, since the different studies often use different instruments, they may only reflect differences between definitions of similar behaviors on different instruments. (It seems improbable that such semantic differences could account for contradictory findings of this strength, however.)

Criterion III. A Defensible Measure of Teacher Effectiveness

The product measure in a relationship--the measure of pupil learning gains--is regarded in this investigation as a means for identifying the competent teacher whose classroom practices are what we are trying to discover. To be defensible for this purpose, the measure should relate to pupil progress toward outcomes that society generally regards as important--the kinds of outcomes, you might say, that teachers are hired to accomplish.

There have been a number of studies of teacher effectiveness in which both teacher behaviors and pupil learnings have been measured during the teaching of a special unit (usually developed by the researcher) over a brief time--a week, a day, even an hour. This is an excellent strategy for studying cause-and-effect relationships between teacher behavior and pupils' immediate learning; but since such a product measure has no demonstrated relationship to teacher effectiveness in achieving long-term goals of education, such studies are irrelevant to our purpose. The ability to raise pupils' scores on a unit test in a short period of time cannot be accepted as a measure of competent teaching, without evidence that the two are highly correlated.

Virtually all of the reportable results we found employed measures of gains in reading or in arithmetic as the basis for assessing teacher effectiveness. Some of these studies also used measures of attitudes toward school or of changes in pupils' perceptions of the self to assess teacher effectiveness in these respects. Relationships with such gains were reported in addition to relationships with cognitive gains from the same study. One or two studies also reported relationships with gains in creativity, work-study skills, or other variables. These results were judged too scattered to be worth reporting here.

Criterion IV. An Interpretable Measure of Teacher Behavior

To be useful for our purpose, a process measure must be defined so that the behavior involved is specified clearly enough to be reproducible when needed. To know that effective teachers explain clearly is of no use to the teacher educator unless one can tell just what a teacher does when explaining clearly. Without this knowledge, how can one train a novice to behave in this way? In effect, this criterion has limited us mainly to what are called "low-inference" observation instruments, although some use has been made of teacher self-report data and even of what some authorities would classify as "high-inference" measures when the behavior in question was clearly described.

RESULTS AND CONCLUSIONS

As we have pointed out, the primary objective of this report was to provide direct access to the findings of research on teacher effectiveness to teacher educators who lack the time, inclination, or technical competence it would take to dig them out personally. Tables 3-43 were designed to accomplish this. Anyone who reads the next few pages of this report can learn from them how to read these tables at a glance. Thus, whatever relevant, important and reliable findings the research contains are at one's disposal.

Immediately following these notes on interpreting the tables is a section in which we have tried to summarize some of the most consistent findings and provide our own interpretation of them. In doing so, we have made no conscious use of any source of information other than the data reported in the tables themselves. This has been done so that the reader who wishes to use these findings in conjunction with information from other sources may be sure that the information from the two sources is, in fact, independent. Too often, conclusions reported in different places are in reality based on the same evidence and present a spurious consistency in appearance, thus gaining credibility in much the same way as an oft-repeated rumor does. If the conclusions we draw are consistent with our readers' own experience, then they may be regarded as mutually supportive. If they are inconsistent, readers should go to the facts to verify our interpretation--or their own.

Notes on Interpreting the Tables

Table 1 illustrates the format in which the 613 relationships are displayed in Tables 3-43. (These tables are grouped together following the text.)

The table title at the head of the page is meant to identify a common element in the process measures listed at the left under the heading "Behavior Item." These are identified where possible by the actual item or category name used in the study; or when the name was not descriptive, a brief descriptive phrase is employed.

At the right of the list of behaviors is a column indicating the grade level or levels of the classes in which the behaviors were observed. At the extreme right, under the heading "Source Symbol," are codes identifying the studies from which the relationships reported for each behavior item came; when available, the number assigned to the item in the actual instrument is also included. This will enable the reader to refer to the original study and identify specific items.

The studies are listed by code in Appendix A, with details about sample, instrumentation, and the like.

Each letter in the body--*L*, *M*, or *H*--identifies a strong relationship; and the location of the letter identifies the two variables related: to the left is the behavior or process variable; above is the teacher effectiveness or product measure.

Thus the first *L* on the upper left tells us that a strong negative relationship was found between "Pupil-initiated vs. teacher-initiated

Table 1 - PUPIL INITIATIONS

BEHAVIOR ITEM	GRADE	LOW SES PUPILS				HIGH SES PUPILS				SOURCE SYMBOL
		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		
		low	high	low	high	school	self	low	high	low	high	school	self	
Pupil-initiated vs. teacher-initiated interchanges	I				L^1						L^1			ESC OScAR
Pupil-initiated interaction vs. response to teacher	I-II	L^1		L^1										S73 RCS1
Pupil initiates substantive interchange	II			L^1						L^1				WGC OScAR
Pupils speak freely	II		L^1					L^1						UGC OScAR
Pupil task-related comments to adults	III			L										SK 388a
Pupil questions, requests, commands--non-academic	III			L	L									SK 477c, 346a
All non-responsive pupil utterances to adults	III			L	L									SK 343a
Pupil initiates substantive interchange	III-VIII			H^1	H^2					H^1	H^2			WGC OScAR
Pupil volunteers information vs. pupil asks for information	III-VIII	H^1						H^1						WGC OScAR
Total pupil-initiated contacts	IV									H	H			GG
Pupil-initiated vs. teacher-initiated substantive interchange	IX-XII		H^1						H^1					WGC OScAR

interchanges" and gains on an arithmetic test made up of items of high complexity, in classes which contained pupils of low socioeconomic status. We also note that they were first grade classes, that the relationship was reported in the Carroll County-West Georgia State study (WGC), and that the process instrument used was OScAR.

The superscript (in this instance, a one) is used to indicate that the relationship is shown twice in the same row of the table; in this case, it also appears under high complexity arithmetic gains in classes with pupils of high socioeconomic status. Reference to Appendix A will verify that in the Carroll County (WGC) study, classes observed had pupils of mixed low and high socioeconomic status.

In the second line, we note a negative relationship between "Pupil-initiated interaction vs. response to teacher" and gains on low-complexity reading test items, and between the same item and gains on low-complexity arithmetic test items, for pupils of low socioeconomic status in grades I and II, reported in Soar 1973 and based on the Reciprocal Category System, Factor 1. The superscript on the two *L*'s indicates that the measure used contained items on both reading and arithmetic.

In reading the tables, the reader may interpret *L* as meaning that the frequency of the behavior in question is *low* in the classes of effective teachers; or, in the case of bipolar measures (like the first two items in Table 1 which contrast two extremes), that the effective teacher will be at the lower of the two poles. Thus, effective teachers in the lower grades, according to these two studies, tend to initiate more, and permit their pupils to initiate fewer, interactions than the ineffective teachers do.

The line across the table divides results found in grades III or lower from those found in the higher grades. Because some studies combined results in grade III with those in higher grades, there is some overlap.

Note that the items below the line, which are similar to those above the line, tend to show strong positive relationships--*H*'s. In the upper grades, the frequency of pupil initiations seems to be *high* in classes of effective teachers--a reversal from the lower grades.

This particular table does not show any curvilinear relationships--does not contain any *M*'s. An *M* should be interpreted as meaning that the frequency of the behavior in question is intermediate in the effective teacher's class, and may be either low or high in the ineffective teacher's class.

Readers are now free to turn to the tables and make their own interpretation. For those who are interested, we now present some interpretations of our own. Please bear in mind that interpretations should not be confused with the facts upon which they are based.

The Structure of Teacher Competence

When independent relationships between a single behavior and two distinct kinds of teacher effectiveness are reported in a study, we have what will be called a *pair* of relationships. Such pairs contain information about the structure of competent teaching which we now propose to examine. If the two

relationships in a pair match--if, for instance, both are *L*'s (as was the case in Table 1 with "Pupil questions, requests, commands--non-academic")--the implication is that teachers competent in the two different ways tend to behave alike. If they do not match--if, for example, one is reported *L* and the other *H*--the indication is that teachers competent in one way behave in an opposite manner from teachers competent in the other way. By examining all such pairs of relationships in Tables 3-43, we can get some idea about the structure of competent teacher behavior. In other words, we can learn something about which behaviors are generic, in the sense that they are equally effective for different objectives and with different kinds of pupils.

We first examined all pairs in which one outcome was cognitive--a measure of achievement gain--and the other affective--a measure of pupils' attitudes toward school. Do teachers who work for and achieve maximum gains on achievement tests do so at the expense of pupils' attitudes toward school? Or are pupils' attitudes highest where achievement gains are also greatest?

Table 2 shows that in the data presented in Tables 3-43 there were 54 pairs of relationships in which one outcome was pupil achievement gains (of one kind or another) and the other outcome was pupils' attitudes toward school. The two relationships matched in 72% of the pairs. These figures suggest that a competent teacher of subject matter is likely to be developing positive attitudes toward school as well.

Next we looked at 36 pairs of relationships in which one outcome was a measure of pupil gains in achievement and the other a measure of improvement in pupil attitudes toward the self. Here we found that 75% of these pairs matched. This suggests that teachers who produce maximum achievement gains are also likely to improve pupils' self-concept the most. These results do not support the notion that efforts to teach children to read and do arithmetic--in and of themselves--are damaging to their self-esteem.

When 60 pairs of relationships to effectiveness in the two major content areas--arithmetic and reading--were examined, we found that 73% of them matched. The implication we draw from this is that (in these data at least) there is relatively little difference in the behaviors of teachers effective in either of these two skill areas. (It may also be important to note that most of these data apply to Grade III or below.)

When 158 pairs of relationships involving low and high complexity outcomes were examined, 91% of them matched. This suggests that our effort to distinguish between items of high and low complexity was not successful.

Finally, we studied pairs of relationships in which the same outcome and behavior were correlated in both high and low SES classes. The figure of 38% shown in Table 2 is based entirely on data from one study (BE), since this was the only study which analyzed relationships in both high and low SES classes separately. The conclusion we draw is that patterns of behavior of teachers effective with low SES pupils differ considerably from those of teachers effective with high SES pupils in these data, and should therefore be examined separately.

In summary, the evidence is that, with early grade pupils of the same SES level, the teacher who produces maximum achievement gains in either reading or arithmetic is quite likely to produce high gains in both subjects and at

Table 2

Percents of Pairs of Process-Product Relationships Between the Same Behavior and Two Types of Outcome Measures That Match (i.e., HH, LL, or MM)

Relationships Paired	Number of Pairs	Percent Matching
Attitude Toward School vs. Achievement Gains (same SES level)	54	72
Gains in Self-Concept vs. Achievement Gains (same SES level)	36	75
Reading Gains vs. Arithmetic Gains (same level of complexity and same SES level)	80	73
High Complexity vs. Low Complexity Gains (same SES level)	158	91
Gains in High SES Classes vs. Gains in Low SES Classes (same subject and level of complexity)	84	38

both levels of complexity (as defined in this paper), and in the pupils' self-concept and attitudes toward school as well. There is also evidence (from one study) that competent teachers of low SES pupils behave quite differently from competent teachers of high SES pupils.

The Competent Teacher of Low SES Pupils in the Primary Grades

In this section, we will examine the differences between the behavior of teachers of low SES pupils whose classes show high mean gains on achievement tests of arithmetic, reading, or both, and the behaviors of teachers of low SES pupils whose classes show low mean gains on these tests. We shall concentrate on those relationships which are reported more than once, preferably in two or more different studies. Since there is evidence that some of these behaviors may be negatively related to pupil attitudes toward themselves and toward school, we shall also discuss relationships to attitudes when available.

Teacher Use of Time. The effective teacher of low SES pupils in Grade III or below differs from the ineffective teacher in devoting more class time to task-related or "academic" activities (6, S73).* A large portion of pupils' time is described in one study as structured, while another (SK) reports more interactions related to lesson content, more class time, more academic activity, and less time in which a child is unoccupied.

Two studies (CRAFT, SK) reported more reading-related activities (7) in classes of more effective teachers; but a third study (BTES) seems to contradict these two. There is also a suggestion that the relationship may depend on the reading methods used (cf. Table 30).

The amount of arithmetic activity (9) observed in one study (SK) was found to be higher in classes taught by effective teachers; the frequency of teaching operational skills was reported greater for the effective teachers in a second study (BTES).

The number of teacher questions asked and/or pupil answers made (16) was found in one study (SK) to be higher in effective teachers' classes on several different items; however, a second study (BE) reported that the proportion of opportunities a pupil had to respond per unit of time in arithmetic lessons was lower in effective teachers' classrooms. This suggests that, even though the total amount of task-related activity is higher in the more effective teachers' classrooms, the distribution of such activities between teacher questions and other task-related activities may also be important.

A final confirmation, verified in two studies (SK, WGC), is provided by the fact that more effective teachers spend less class time discussing matters unrelated to lesson content (42).

To summarize: mainly one study (SK) provides support for the conclusion that effective teachers of low SES pupils in the primary grades engage their pupils in more lesson-related activities than less effective teachers do; yet

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*From here on in the text, numbers in parentheses refer to tables, and code symbols refer to studies (identified in Appendix A).

there is enough confirmation from other studies to justify considerable confidence that this conclusion is correct. It should also be noted that no evidence one way or the other was found that this particular kind of behavior was related to pupil attitudes toward school.

Organizing for Instruction. Effective and ineffective teachers of low SES pupils also differ in how they usually organize their classrooms: it is the less effective teachers who spend more time working with pupils in small groups and less time working with the whole class or a large group of pupils (3).

The evidence that effective teachers spend more time with large groups and less with small ones comes mainly from one study (SK) but is verified in one other study (BTES).

The amount of time pupils spend working independently in small groups (4) is reported in two studies (S73, SK) as consistently *lower* in classes where achievement gains are high. The picture is very much the same with respect to seatwork (5), with closely similar findings reported in four different studies (BTES, WGC, S73, SK).

A fifth study (BE) reports that effective teachers assign more seatwork than ineffective ones, but does not indicate directly that the effective teachers' pupils spend more time in seatwork (which would conflict with the findings of other studies). The sixth item in Table 5 indicates that effective teachers individualize assignments more than ineffective ones do. These two items suggest that effective and ineffective teachers differ not only in the amount of seatwork they assign but also in what the pupils do at their seats. Evidence that the two types of teachers also behave differently during seatwork time will be presented below.

There is some evidence in these tables (4, 5) that the amount of time pupils spend in small groups without a teacher (or other adult) present is related to their attitudes toward school. When the individual or group is described as working independently (SK 138, 142), attitudes toward school are high. Otherwise (S73 FLA6, TP4) they are low. It appears that teachers who permit more independent work have classes who like school better, but learn less; teachers who have a lot of nonindependent small group work have classes who neither like school nor learn much. The teacher who permits the least amount of individual and small group work has the greatest gains in achievement and gets mixed results as far as attitudes are concerned. Independent seatwork does not seem to help the pupils' self-image much either (SK 138, 142).

Quality of Instruction. What kinds of questions and what ways of responding to pupils distinguish the more effective teacher of low SES pupils from the less effective teacher? We have consistent evidence (Table 18) from four different studies (S72, S73, WGC, SK) that effective teachers of low SES pupils ask more questions classifiable in the lower levels of the Bloom taxonomy than ineffective teachers do. This difference holds no matter how teacher effectiveness is defined--whether in terms of high or low complexity outcomes in arithmetic or in reading. A fifth study (BE) suggests that effective teachers of low SES students ask fewer "choice" questions--that is, questions which offer a limited choice of answers. The general conclusion that effective teachers prefer low-level questions seems justified, despite this one somewhat inconsistent finding.

Evidence that effective teachers also ask fewer high-level questions (19) is less extensive, but the results from three studies (S72, S73, WGC) agree.

Patterns of teacher reactions to pupil responses are complex; however, there are findings from three studies (Perham, S73, BE) which indicate that the effective teacher of low SES pupils is less likely to be seen amplifying, discussing, or using pupil answers than the ineffective teacher (21). The alternative to discussing a pupil answer is either to acknowledge it or to give feedback and then go on to something else. There is some evidence (SK, BE), not entirely consistent (cf. BE S164), that this is what the effective teacher is likely to do (20). This seems consistent with a preference for low-level questions, since it is high-level questions--those calling for analysis, synthesis, evaluation--which are usually appropriate to discuss or amplify, not low-level ones.

The number of pupil-initiated questions and comments (14) also tends to be lower in classes taught by effective teachers than in those taught by ineffective ones, according to results reported in three studies (WGC, S73, SK). Moreover, effective teachers treat pupil initiations differently than ineffective teachers do (15); they are less likely to listen and provide feedback to pupils or to solicit questions from them than ineffective teachers are (WGC, BE).

It seems clear that in low SES classes at this level, the competent teacher keeps interaction at a low level of complexity and pupil initiative. He or she does not encourage pupils to analyze, synthesize, evaluate, or indeed to do anything but answer rather narrow questions asked by the teacher. The teacher who encourages such pupils to express themselves freely, to think, to question, to discuss, is not effective in teaching them to read or do arithmetic.

The only evidence that any of this has a direct impact on pupils' attitudes toward school is one item (WGC TP23) suggesting that pupil attitudes are low in classrooms in which questions tend to be narrow and followed by quick feedback--that is, in classes taught by effective teachers (18).

Environmental Maintenance. Evidence from five studies (Bemis, S73, BTES, WGC, BE) indicates that there is less deviant or disruptive pupil behavior (35) in classes taught by effective teachers than in classes taught by ineffective teachers. One study (Bemis) reports more hyperactive pupil behavior in effective teachers' classes and more instances in which the teacher talks over pupil noise. Since the same study reports less disruptive pupil behavior where there is more hyperactive pupil behavior, it would appear that neither of the two items reflects disruptive behavior but rather excitement that is probably task related.

Data related to teacher rebukes (34) is consistent with these findings: such behavior is less frequent in the classrooms of more effective teachers (WGC, CRAFT). Findings from three studies (WGC, CRAFT, BE) also indicate that effective teachers devote less time to managing their classrooms than ineffective ones do (31). (This dovetails with the finding already reported that effective teachers spend more time in academic activities.)

There is also some evidence related to what may be called the *quality* of teachers' efforts at classroom management (32). Effective teachers differ from less effective ones in that they control their classrooms with less criticism

(cf. Table 34), and use a more varied repertory of techniques in doing so (WGC). An effective teacher's errors in management are more likely to take the form of overreactions, and less likely that of errors in timing (32, BE); and a pattern in which the teacher supports appropriate pupil behavior and ignores inappropriate behavior was observed less often in the behavior of effective teachers (WGC).

Effective teachers were found in three studies (SK, CRAFT, BE) to use more praise or positive motivation (40), although there were some indicators (CRAFT) that this depended on the context. Effective teachers were observed in one study (SK) to make more use of token reinforcement (39); but another study found that it was the ineffective ones who reported most frequent use of such things as gold stars and special privileges (BE).

Permissive behavior--giving pupils freedom to govern their own activities (43)--was consistently found to be more common in classes of less effective teachers (S73, WGC, BE).

There is evidence from one study (WGC) that pupil attitudes are more favorable toward school in the more orderly environment maintained by the effective teacher (31, 32, 33, 34, 35).

In summary, the effective teacher maintains an environment that is supportive and, if not always quiet, free from disruptive pupil behavior. She or he maintains this environment with little apparent effort or expression of negative affect.

Individual Attention. It was noted at the beginning of this section that the effective teacher of low socioeconomic status pupils in Grade III and below sets pupils to work in small groups or as individuals (seatwork) less of the time than the ineffective teacher does, and spends more time working with them all in one large group. The effective teachers' pupils do spend some time in seatwork or "independent" study; but their teachers behave differently during this time than ineffective teachers. For one thing, they spend more time checking individual pupils' work (25); for another, they are less perfunctory when they do so (26). Evidence from two studies (BTES, BE) indicates that, even though their pupils may spend less time in seatwork, effective teachers spend more of their time working with individual pupils, and are more likely to have initiated the contact themselves.

An interesting point is the indication (in Table 25) that, in the more effective teacher's classroom, the proportion of teacher-initiated contacts with pupils that relate to lesson content is neither higher nor lower than it is in the classes of less effective teachers, but somewhere between (BE). The teacher who hardly ever speaks to a pupil about anything but class work is not the effective one; nor is the teacher who spends too much time in nonsubstantive conversation (cf. Table 42). The effective teacher seems to know how much is enough.

When the effective teacher does talk to an individual pupil, two studies (BE, S73) agree that she or he tends to talk longer, to pay closer attention to the pupil than the less effective teacher (26).

The general picture these data convey is clear. When the effective teacher's pupils work independently, the teacher actively supervises them,

giving careful attention to those individual children who, in the teacher's opinion, need it. The ineffective teacher who assigns pupils to seatwork leaves them pretty much to themselves; anyone who needs help must seek it.

Evidence about teacher mobility (27) would seem to be related to this area, but what evidence there is is not consistent. One study (SK) reports that the more effective teachers move about more than less effective ones, which seems consistent with what we have found. But another study (BTES) reports that effective teachers (of arithmetic, at least) spend more time at their desks than ineffective ones. A third study (WGC) reports that the competent teacher is more aloof and detached than the less competent teacher.

One way of reconciling these findings would be to interpret them as grade related--as indicating that the effective third grade teacher moves about a lot, while the effective second grade teacher sits at the desk looking aloof and detached. Needless to say, such a conclusion needs verification before it is taken very seriously, since the different grades were observed in different sites. The conflicting evidence that effective teachers work with individuals both closely and often has been verified in different sites and demands to be taken seriously.

The evidence regarding the effects of individual attention on pupil attitudes is mixed. The behaviors that are more common where pupils' attitudes toward school are favorable are: teacher checking pupil work (25, BTES) and teacher aloof, detached from pupil activities (27, WGC)--both observed in the second grade.

Teacher Competence and Pupil SES in the Primary Grades

A question that has important implications for teacher education is whether the same patterns of behavior are effective in classes made up mainly of pupils of low socioeconomic status and in classes of pupils made up of high socioeconomic status. We do not have much information on this point because only one of the studies used in this review obtained comparable data in classes of both types. There are, however, a surprising number of instances (62% of all pairs) in which a process-product relationship reverses between the two types of classes--that is, instances in which the ineffective teacher in one group behaves like the effective teacher in the other.

Such reversals cannot be verified in other studies as the relationships reported in the last sections could; on the other hand, any such reversal reported in one of the tables is statistically significant beyond the .01 level, and represents a difference of at least .78 between the two correlations involved. We have found such reversals in two areas--one related to the conduct of classroom discussion, and the other related to teacher attention to individual pupils.

Conduct of Discussion. Effective teachers in high SES classes are most likely to use one of the two following questioning patterns: (1) to identify the pupil who is to answer a question before asking it, or (2) to ask a question and then call on a pupil who indicates a desire to answer the question. Effective teachers in low SES classes are most likely to use a third strategy--to ask a question first, and then choose a respondent who probably has not indicated a desire to answer the question (29).

In a high SES class taught by an effective teacher, the pupil is more likely to answer incorrectly than a pupil in a low SES class taught by an effective teacher (17).

Once the pupil has answered, the effective teacher in the high SES class is more likely to discuss the pupil's answer than the effective teacher in the low SES class (21)--unless the answer is incorrect.

If the pupil's answer is incorrect, the effective teacher in the high SES class is more likely either to criticize the pupil's answer or to answer the question personally than the effective teacher in the low SES class (22).

If the pupil fails to answer, the effective teacher in the high SES class is *less* likely to give him or her another chance to respond (by repeating or rephrasing the question or asking a new question) than the effective teacher in the low SES class (24).

If the pupil says he or she does not know the answer, the effective teacher in the high SES class is more likely to call on someone else than the effective teacher in the low SES class (24).

In summary, the relationships just discussed seem to indicate two distinct discussion strategies.

In Strategy I, the questions tend to be difficult and to require the pupil to think; and the teacher tends either to indicate who is to answer the question before asking it, or to let a volunteer respond. If the answer is incorrect, the teacher is likely to be critical of it or to give the answer. The pupil who fails to answer or doesn't know the answer is not likely to get a second opportunity; the teacher will give someone else a chance to answer it. The teacher who uses this strategy successfully seems to be challenging pupils to respond near their highest level of capability.

Strategy I seems to be appropriate in classes made up of high SES pupils but inappropriate in classes made up of low SES pupils.

In Strategy II, the questions appear to be simple ones, since they elicit responses that are usually correct and seldom merit further discussion. The teacher is likely to raise a question first and then to indicate who is to answer it, possibly as a way of holding pupils' attention. The teacher seems to choose a respondent likely to get the right answer, since wrong answers are relatively infrequent. Criticism of a pupil's answer is rare, even when it is incorrect; and if a pupil fails to answer or does not know the answer, the teacher is more likely to help out (perhaps by rewording the question, or perhaps by asking an easier one) than to turn to another pupil. The teacher who uses Strategy II appears to be more concerned with giving pupils a chance to experience success than to challenge them with difficult questions.

Strategy II is used by effective teachers in classes made up mainly of low SES pupils and by ineffective teachers in classes of high SES pupils.

It should be remembered that these findings come from one study (BE) and have not been verified elsewhere as yet.

Attention to Individual Pupils. There are a few contrasting findings in the tables (all from BE) which suggest that how much attention a competent teacher pays to individual pupils also depends on SES. We noted in the last section of this report that the effective teacher of low SES pupils tends to pay more and closer attention to individual pupils during seatwork and small-group activity periods than the ineffective teacher does.

There is evidence that this relationship may reverse in classes in which most pupils are of high SES. It is the less effective teachers in these classes who accept a higher proportion of pupil attempts to initiate work contacts (15), who initiate a higher proportion of private contacts related to arithmetic (25), and who are most likely to give long feedback during teacher-initiated work contacts (26).

As far as they go, these findings indicate that the teacher who gives the most individual attention to pupils in high SES classes is the one who is least effective in producing cognitive gains, and that the reverse is true in low SES classes.

Concluding Remarks. In this section we have examined the tables for evidence about whether the nature of competent teacher behavior depends on the SES of the pupils being taught. We did so in part to illustrate a way of using the tables that is different from the one illustrated in the preceding section. In the earlier section, we looked for consistencies across studies; one might say that we exploited similarities in the relationships. In this section we have exploited differences in relationships within a single study. The former approach leads to results that are much more impressive--harder to question--than those obtained in this section. The kind of findings obtained in this section are neither as obvious nor as impressive, but are not to be dismissed lightly, since each difference reported is so great.

If they are accepted as read, these findings have clear implications for teacher educators, for researchers, and for educators. For teacher educators, they strongly suggest that teacher education students may need to learn very different strategies for dealing with pupils from different backgrounds, at least in these earlier grades.

For the researcher, they indicate a great need for further study of how optimal teaching strategies vary with the setting in which the teacher works. Much more could have been learned about these matters from the various studies of Follow Through (SK) and from Beginning Teacher Evaluation Study (BTES) if the samples had been chosen to represent both SES levels, and if the two types of students had been isolated in the analysis. And the increase in cost would have been negligible.

The implications for the public schools might be the most far-reaching of all. If there are many strategies which have opposite effects on pupils of these two types (or any others), is it fair to the pupils (or to the teachers) to mix them together in the same classroom? More findings like these would indicate a negative answer.

Competent Teacher Behavior in the Upper Elementary Grades

There has been much less reviewable research done in grades above the third, and making sense of what there is calls for more imagination or ingenuity. Following are the principal differences we find between effective and ineffective teachers in these grades, ignoring pupil SES.

The effective teacher in upper elementary grades talks more (13, S66, Sp; 28, WGC); keeps pupils on task more (36, WGC, BTES); and is less permissive (37, WGC; 43, WGC, SoK), although the pupils do initiate more interchanges than those in classes taught by less effective teachers (14, WGC, GG). The effective teacher's questions tend to be easier and of a lower cognitive level, however (17, 22, 40, GG; 19, WGC; 20, S66; 21, WGC). The picture that emerges is one in which the teacher presents most of the content, with low-level teacher questions and pupil questions interspersed.

The effective teacher manages the upper elementary classroom with less effort and is more selective in use of rebukes or criticism (31, 33, WGC; 34, WGC, Sp, GG; 35, WGC, BTES). During seatwork, upper elementary pupils in effective teachers' classrooms are more likely to approach the teacher, and the teacher is less likely to approach the pupils (25, GG); and teachers attend pupils less closely (26, WGC), which suggests more pupil autonomy. There is also some indication that more effective teachers favor less traditional materials (11, WGC, BTES).

Inspection of relationships to affective gains indicate that pupils' self-concepts improve in the classes where cognitive level is low (18) and where management is unobtrusive (33, 34, 35), and that attitudes toward school are also high where the latter competence is displayed.

In summary, the picture we derive of the effective teacher in these grades is rather traditional and, let's face it, unexciting. These implications are not nearly as well supported as those drawn about teachers of low SES pupils in grade three and below. Most of them are based on results from more than one study, however, unlike the conclusions we drew above about differences between low and high SES classes. Those should be viewed as tentative at best.

Concluding Remarks

The reader should bear in mind that these attempts to interpret some of the findings in Tables 3-43 are to be regarded as of secondary importance. The facts shown in the tables are the primary product of this study, and we would prefer that the value of the study be judged according to their usefulness rather than on the merits of our interpretations of them. If we have succeeded in providing easier access to some of the strongest findings of the research in teacher education, we have done what we set out to do.

If there is one conclusion that we would like the reader to share with us, it is the conclusion that fairly leaps from these pages: where sufficient effort and resources have been applied to the study of teacher effectiveness, useful and dependable findings have emerged. This approach to the study of teacher effectiveness does work, and we need more of it.

TABLES 3 to 43, Inclusive*

*Instructions for interpreting tables are presented on pp. 10 - 12

Table 3 - GROUP SIZE

BEHAVIOR ITEM	GRADE	LOW SES PUPILS						HIGH SES PUPILS						SOURCE SYMBOL
		READING GAINS		ARITHMETIC GAINS		AFFECTIVE GAINS		READING GAINS		ARITHMETIC GAINS		AFFECTIVE GAINS		
		complexity		complexity				complexity		complexity				
		low	high	low	high	school	self	low	high	low	high	school	self	
Adult with large group of pupils-general	III	H	H	H	H	H								SK89 et al.
Adult with large group of pupils-arithmetic	III	H	H	H	H	H	H							SK 123,135
Adult with large group of pupils-reading	III	H	H	H	H	H								SK 146,158
Teacher, aide, or any adult with small group of pupils	III	L	L											SK 106,88, 94
Small group with teacher (arithmetic)	III			L										SK 122
Small group with any adult (arithmetic)	III	L	L											SK 134
Adult (other than teacher) working with (small) group	II				L[1]						L[1]			BTES AP
Small group with teacher, aide, or any adult (reading)	III	L	L				L							SK 157,145, 149

Table 4 - SMALL GROUP WITHOUT ADULT

BEHAVIOR ITEM	GRADE	LOW SES PUPILS						HIGH SES PUPILS						SOURCE SYMBOL
		READING GAINS		ARITHMETIC GAINS		AFFECTIVE GAINS		READING GAINS		ARITHMETIC GAINS		AFFECTIVE GAINS		
		complexity		complexity				complexity		complexity				
		low	high	low	high	school	self	low	high	low	high	school	self	
Pupils work without teacher--seatwork, parallel or instructional group	I	L^1	L^2	L^1	L^2									S73 FLA6
Pupils work without teacher--seatwork, parallel or instructional group	II	L^1	L^2	L^1	L^2	L								S73 FLA6
Hours of instructional learning without teacher vs. hours of structured learning with teacher	K,II	L^1	L^2	L^1	L^2									S73 CDR3
Small group working independently (arithmetic)	III	L		L	L	H	L							SK 138
Two pupils working independently (arithmetic)	III	L		L	L									SK 137
Two pupils working independently (reading)	III			L										SK 160

Table 5 - SEATWORK

BEHAVIOR ITEM	GRADE	LOW SES PUPILS			HIGH SES PUPILS			SOURCE SYMBOL
		READING GAINS complexity	ARITHMETIC GAINS complexity	AFFECTIVE GAINS	READING GAINS complexity	ARITHMETIC GAINS complexity	AFFECTIVE GAINS	
		low high	low high	school self	low high	low high	school self	
Activity: seatwork	II	L^1			L^1			BTES R15
Pupil self-directed and task oriented	II	L^1	L^2		L^1	L^2		WGC FLACCS
All pupils work on same task at same time, are responsible for same assignments, no individualized assignments	II	L^1	L^1	L				S73 TP4
All pupils working independently (arithmetic)	III		L	H L				SK 142
Teacher assigns large amount of seatwork	II-III	H						DE 18
Teacher individualizes assignments	II		H^1			H^1		WGC TP17

Table 6 - ACADEMIC TIME

BEHAVIOR ITEM	GRADE	LOW SES PUPILS						SOURCE SYMBOL
		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		
		low	high	low	high	school	self	
Structured vs. unstructured time	I-II	H^1	H^2	H^1	H^2			S73 CDR6
Total academic verbal interactions	I	H		H	H			SK 435a
Structured learning with teacher	II	L^1	H^2	L^1	H^2			S73 CDR3
Total academic verbal interactions	III			H	H			SK 566c
Percent of observations in which an academic activity is occurring	III	H		H	H			SK 242
Total class duration	III			H	H			SK 17
Unoccupied child	III			L	L			SK 77

BEHAVIOR ITEM	GRADE	HIGH SES PUPILS						SOURCE SYMBOL
		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		
		low	high	low	high	school	self	
Structured vs. unstructured time	I-II							S73 CDR6
Total academic verbal interactions	I							SK 435a
Structured learning with teacher	II							S73 CDR3
Total academic verbal interactions	III							SK 566c
Percent of observations in which an academic activity is occurring	III							SK 242
Total class duration	III							SK 17
Unoccupied child	III							SK 77

Table 7 - TIME SPENT ON READING

BEHAVIOR ITEM	GRADE	LOW SES PUPILS				HIGH SES PUPILS				SOURCE SYMBOL
		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		
		low	high	low	high	school	self	low	high	low	high	school	self	
Reading activities (self report)	I		H											CRAFT log
Reading, alphabet, language development activities	I	H	H											SK 67
Number of pupils involved in reading	I	H	H											SK 163
Reading, alphabet, language development activities	III			H										SK 67
Number of pupils involved in reading	III			H	H									SK 163
Time teacher spends preparing and teaching reading (self report)	II	L^1	L^2					L^1	L^2					BTES WD1
Total reading time (self report) (Phonovisual method)	II		L											CRAFT log
Time teaching decoding skills in reading (self report)	V		L^1						L^1					BTES WD2

Table 8 - TIME SPENT IN READING-RELATED ACTIVITIES

BEHAVIOR ITEM	GRADE	LOW SES PUPILS				HIGH SES PUPILS				SOURCE SYMBOL
		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		
		low	high	low	high	school	self	low	high	low	high	school	self	
Supportive rate (self report)	I		H											CRAFT log
Supportive activities (self report) (Language experience method)	II	L												CRAFT log
Listening to stories (self report) (Phonovisual method)	I		H											CRAFT log
Listening to stories (self report) (Language experience method)	II	L	L											CRAFT log
Listening to poetry (self report) (Basal reader method)	II		H											CRAFT log
Percent of time in spelling	II-III							M	M	M				BE 5(T4)
Percent of time in language arts	II-III			L						L				BE 2(T4)

Table 9 - TIME SPENT ON ARITHMETIC

BEHAVIOR ITEM	GRADE	LOW SES PUPILS			HIGH SES PUPILS			SOURCE SYMBOL
		READING GAINS complexity low high	ARITHMETIC GAINS complexity low high	AFFECTIVE GAINS school self	READING GAINS complexity low high	ARITHMETIC GAINS complexity low high	AFFECTIVE GAINS school self	
Numbers, mathematics, arithmetic activities	III		H H					SK 66
Number of pupils involved in arithmetic	III		H H					SK 140
Frequency of teaching operation skills in arithmetic (self report)	II		H^1 H^2			H^1 H^2		BTES WD

Table 10 - TIME SPENT IN OTHER SUBJECTS

BEHAVIOR ITEM	GRADE	LOW SES PUPILS				HIGH SES PUPILS				SOURCE SYMBOL
		READING GAINS		ARITHMETIC GAINS		AFFECTIVE GAINS		READING GAINS		ARITHMETIC GAINS		AFFECTIVE GAINS		
		complexity		complexity				complexity		complexity				
		low	high	low	high	school	self	low	high	low	high	school	self	
Art work with reading (self report)	II		L											CRAFT log
Total science time (self report)	II	M	M											CRAFT log
Total social studies time (self report)	II		M											CRAFT log
Percent of time in social studies	II-III				M						M			BE 7 (T4)
Percent of time in art	II-III								H					BE 4 (T4)
Group time	III			L			L							SK 62
Story, music, dancing activities	III	L		L	L									SK 63

Table 11 - READING MATERIALS

BEHAVIOR ITEM	GRADE	LOW SES PUPILS				HIGH SES PUPILS				SOURCE SYMBOL
		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		
		low	high	low	high	school	self	low	high	low	high	school	self	
Use of basal reader other than state adopted (self report)	II		L^1						L^1					BTES WD
Use of books, etc. (secondary)	II	H^1	H^2					H^1	H^2					BTES R11
Wide range of informative materials available	II		L^1			H^2			L^1			H^2		WGC TP4
Use of games (self report)	II		L^1						L^1					BTES WD
Wide range of informative materials available	III-VIII		H^1			H^2			H^1			H^2		WGC TP4
Use of workbook other than basic (self report)	V	L^1						L^1						BTES WD
Use of board, etc. (secondary)	V	L^1						L^1						BTES R12

Table 12 - ARITHMETIC TEACHING MATERIALS

BEHAVIOR ITEM	GRADE	LOW SES PUPILS			HIGH SES PUPILS			SOURCE SYMBOL
		READING GAINS complexity	ARITHMETIC GAINS complexity	AFFECTIVE GAINS	READING GAINS complexity	ARITHMETIC GAINS complexity	AFFECTIVE GAINS	
		low high	low high	school self	low high	low high	school self	
Use of programmed materials (self report)	II		H^1 H^2			H^1 H^2		BTES WD
...teacher-made materials (self report)	II		H^1 H^2			H^1 H^2		BTES WD
...individualized materials (self report)	II		H^1			H^1		BTES WD
Games	II		L^1			L^1		BTES R19
Games, toys, play equipment present	III		L L					SK 25
Audio-visual equipment present	III		L L					SK 37
Audio-visual equipment used	III		L					SK 38

Table 13 - STEADY-STATE TEACHER TALK

BEHAVIOR ITEM	GRADE	LOW SES PUPILS			HIGH SES PUPILS			SOURCE SYMBOL
		READING GAINS complexity	ARITHMETIC GAINS complexity	AFFECTIVE GAINS	READING GAINS complexity	ARITHMETIC GAINS complexity	AFFECTIVE GAINS	
		low high	low high	school self	low high	low high	school self	
Steady-state teacher talk vs. pupil talk	I	L^1	L^1					S73 RCS5
Teacher tells story, pupils attentive, interested	II	L^1 L^2			L^1 L^2			WGC CS1
Steady-state teacher talk vs. pupil talk	II	H^1	H^1					S73 RCS5
Teacher lectures, pupils bored	II	H^1 H^2			H^1 H^2			WGC CS2
Extended teacher talk and inquiry vs. drill	III-VI				H	H	H	S66 F3
Business-like lecture method, insistence on attention to tasks and conformity	IV,VI				H H			Sp F6

Table 14 - PUPIL INITIATIONS

BEHAVIOR ITEM	GRADE	LOW SES PUPILS						HIGH SES PUPILS						SOURCE SYMBOL
		READING GAINS		ARITHMETIC GAINS		AFFECTIVE GAINS		READING GAINS		ARITHMETIC GAINS		AFFECTIVE GAINS		
		complexity low	high	complexity low	high	school	self	complexity low	high	complexity low	high	school	self	
Pupil-initiated vs. teacher-initiated interchanges	I				L^1						L^1			WGC OScAR
Pupil-initiated interaction vs. response to teacher	I-II	L^1		L^1										S73 RCS1
Pupil initiates substantive interchange	II			L^1						L^1				WGC OScAR
Pupils speak freely	II		L^1					L^1						WGC OScAR
Pupil task-related comments to adults	III			L										SK 388a
Pupil questions, requests, commands--non-academic	III			L	L									SK 477c, 346a
All non-responsive pupil utterances to adults	III			L	L									SK 343a
Pupil initiates substantive interchange	III-VIII			H^1	H^2					H^1	H^2			WGC OScAR
Pupil volunteers information vs. pupil asks for information	III-VIII	H^1						H^1						WGC OScAR
Total pupil-initiated contacts	IV									H	H			GG
Pupil-initiated vs. teacher-initiated substantive interchange	IX-XII		H^1						H^1					WGC OScAR

Table 15 - TEACHER ENCOURAGES PUPIL PARTICIPATION

BEHAVIOR ITEM	GRADE	LOW SES PUPILS						HIGH SES PUPILS						SOURCE SYMBOL
		READING GAINS		ARITHMETIC GAINS		AFFECTIVE GAINS		READING GAINS		ARITHMETIC GAINS		AFFECTIVE GAINS		
		complexity		complexity				complexity		complexity				
		low	high	low	high	school	self	low	high	low	high	school	self	
Teacher listens to pupils and provides feedback	II	L^1						L^1						WGC FL27
Teacher pauses, asks for questions, and answers them before proceeding	II	L^1	L^2					L^1	L^2					WGC FLA
Short feedback on pupil question	II-III	L		H				L		H				BE L83
Teacher gives long feedback on pupil question	II-III	L		L				L						BE L84
Teacher praises pupil opinion question	II-III		H											BE Q126

Table 16 - NUMBER OF TEACHER QUESTIONS

BEHAVIOR ITEM	GRADE	LOW SES PUPILS						HIGH SES PUPILS						SOURCE SYMBOL
		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		
		low	high	low	high	school	self	low	high	low	high	school	self	
Pupil responses, academic	I	H		H	H									SK 360a, 491c
Ratio of total opportunities pupil has to respond to total time (arithmetic)	II-III		L						H	H				BE T169
Group response to question, command, etc.	III	H		H	H									SK 363a
Pupil responses, academic	III			H	H									SK 360a, 491c
Pupil responses, total	III			H										SK 358a
Direct academic questions, requests, commands	III			H	H									SK 353a, 451a, 582c

Table 17 - PUPIL RESPONSE TO TEACHER QUESTIONS

BEHAVIOR ITEM	GRADE	LOW SES PUPILS						HIGH SES PUPILS						SOURCE SYMBOL
		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		
		low	high	low	high	school	self	low	high	low	high	school	self	
Percent correct	II-III		H		H									BE C7
Percent incorrect	II-III	L	L	L	L			H	H		H			BE C9
Percent no response	II-III				L						L			BE C11
Percent don't know	II-III		H	H					H	M				BE C10
Number wrong	IV									L	L			GG
No response	IV									L	L			GG
Percent correct	IV									H	H			GG

Table 18 - LOW COGNITIVE LEVEL QUESTIONS

BEHAVIOR ITEM	GRADE	LOW SES PUPILS				HIGH SES PUPILS				SOURCE SYMBOL
		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		
		low	high	low	high	school	self	low	high	low	high	school	self	
Convergent teaching--teacher central, low-level questions, quick response, feedback	I-II	H^1	H^2	H^1	H^2									S73 TP1
Narrow questions, drill, pupil response	I	H^1		H^1										S73 RCS3
Questions calling for translation, interpretation	K-I		H^1		H^1									S72 TCB3
Questions calling for interpretation	K-I	H^1		H^1										S72 TCB1
Narrow questions, immediate feedback	II	H^1	H^2			L^3		H^1	H^2			L^3		WGC TP23
Direct academic questions, requests, commands	III			H	H									SK 451a, 582c, 353a
Percent of substantive questions that offer limited choice of answers (yes-no, etc.)	II-III			L						H				BE B6
Recitation (low-level questions, quick feedback, narrow focus)	V		H^1				H^2		H^1				H^2	S73a F11

Table 19 - HIGH COGNITIVE LEVEL QUESTIONS

BEHAVIOR ITEM	GRADE	LOW SES PUPILS						HIGH SES PUPILS						SOURCE SYMBOL
		READING GAINS		ARITHMETIC GAINS		AFFECTIVE GAINS		READING GAINS		ARITHMETIC GAINS		AFFECTIVE GAINS		
		complexity		complexity				complexity		complexity				
		low	high	low	high	school	self	low	high	low	high	school	self	
Broad answers vs. narrow ones	K-I		L[1]		L[1]									S72 TCB2
Open questions and pupil self-evaluation and free inquiry vs. closed, text-oriented questions, teacher evaluation	I-II	L[1]		L[1]										S73 TP7
Concept attainment by discovery method	II		L[1]						L[1]					WGC CS8
Teacher avoids causing pupil doubt or uncertainty	III-VIII		H[1]				H[2]		H[1]				H[2]	WGC TP6

Table 20 - TEACHER REACTION TO PUPIL RESPONSE--GENERAL

BEHAVIOR ITEM	GRADE	LOW SES PUPILS						HIGH SES PUPILS						SOURCE SYMBOL
		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		
		low	high	low	high	school	self	low	high	low	high	school	self	
Total feedback (academic)	I	H	H	H	H									SK 412a, 543c
Positive corrective feedback (academic)	I			H	H									SK 406a
Asks new question	II-III			H	H				L					BE J69
Repeats question	II-III	L	L					H	H		L			BE S163
Acknowledgement, task-related, non-academic	III			L										SK 397a
No feedback (when answer is correct)	II-III		H		L				H		L			BE D14
Rephrases question or gives clue	II-III	H	H		M			M			H			BE S164
Criticism	III-IV									L	L			S66 F1
Non-evaluative	V	L^1	L^2					L^1	L^2					BTES AP

Table 21 - TEACHER REACTION TO PUPIL RESPONSE--AMPLIFICATION, EXTENSION

BEHAVIOR ITEM	GRADE	LOW SES PUPILS						HIGH SES PUPILS						SOURCE SYMBOL
		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		
		low	high	low	high	school	self	low	high	low	high	school	self	
Teacher uses pupil ideas, probes	K-I			L[1]						L[1]				Perham
Teacher responds to pupil & amplifies	II	L[1]		L[1]										S73 RCS2
Teacher discusses pupil answer (total)	II-III		L						H					BE J68
Teacher discusses correct answer	II-III		L					H	H					BE D15
Teacher discusses wrong answer	II-III	M		L										BE F31
Teacher helps pupil correct misperception	II				H[1]						H[1]			WGC TP8
Teacher helps pupil correct misperception	III-VIII		L[1]						L[1]					WGC TP8

Table 22 - TEACHER REACTION TO WRONG ANSWER

BEHAVIOR ITEM	GRADE	LOW SES PUPILS						HIGH SES PUPILS						SOURCE SYMBOL
		READING GAINS		ARITHMETIC GAINS		AFFECTIVE GAINS		READING GAINS		ARITHMETIC GAINS		AFFECTIVE GAINS		
		complexity		complexity				complexity		complexity				
		low	high	low	high	school	self	low	high	low	high	school	self	
Repeats, rephrases, or asks new question	II-III	M	M	M	M				M	M	M			BE F35, 36,38
No feedback	II-III		L											BE F30
Gives the answer	II-III	L	L	L	M				M					BE F32
Criticizes	II-III	L	L	L	L			M	M	L	M			BE F29, J66B
Negates (neutral rejection)	IV									L	L			GG

Table 23 - TEACHER REACTION WHEN PUPIL RESPONSE IS PART CORRECT

BEHAVIOR ITEM	GRADE	LOW SES PUPILS						HIGH SES PUPILS						SOURCE SYMBOL
		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		
		low	high	low	high	school	self	low	high	low	high	school	self	
Gives the answer	II-III	H	H		H			H	H		L			BE E21
Calls on someone else	II-III	M						M		M				BE E22
Asks a new question	II-III		H	H					L	L				BE E27
Rephrases or gives clue (morning)	II-III		H						H					BE E26
Repeat, rephrase, or ask new question	II-III	L	H					L	L					BE E24

Table 24 - TEACHER REACTION WHEN PUPIL FAILS TO ANSWER QUESTION OR SAYS "DON'T KNOW"

BEHAVIOR ITEM	GRADE	LOW SES PUPILS						HIGH SES PUPILS						SOURCE SYMBOL
		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		
		low	high	low	high	school	self	low	high	low	high	school	self	
Repeats, rephrases, or asks new question	II-III	H	M	H	H			L	H	L	L			BE 163, G44
Rephrases (or gives clue)	II-III		H		L				L		H			BE 164
Repeats question	II-III	H			M			L			L			BE S163
Another pupil calls out the answer	II-III		H	M	H				L					BE G43, J74
Calls on another pupil (no answer)	II-III		M	M	M			H	H	H	H			BE J73
Calls on another pupil (don't know)	II-III	L	L					H						BE G42
Gives the answer	II-III							H	H	H	H			BE G41
Criticizes	II-III							H	H					BE G39

Table 25 - TEACHER WORKS WITH INDIVIDUAL PUPIL

BEHAVIOR ITEM	GRADE	LOW SES PUPILS						HIGH SES PUPILS						SOURCE SYMBOL
		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		
		low	high	low	high	school	self	low	high	low	high	school	self	
Teacher checking pupil work	II		H[1]			H[2]			H[1]			H[2]		BTES AP
Teacher-initiated dyadic contacts per unit of teaching time (reading groups)	II-III				H									BE U170
Proportion of teacher-initiated contacts that relate to class work	II-III	H	M	M				L	M	M				BE P146
Percent of time pupil works alone with teacher (arithmetic)	II				H[1]						H[1]			BTES AP
Proportion of arithmetic contacts that are teacher-initiated, private	II-III	H						L	L	L	L			BE T167
Proportion of pupil-initiated work contacts accepted	II-III	H	H	H	L			L	L	H	L			BE N105
Ratio of teacher-initiated contacts to pupil-initiated contacts	IV									L	L			GG
Pupil-initiated work contact with teacher feedback	IV									H	H			GG

Table 26 - CLOSE ATTENTION TO PUPILS

BEHAVIOR ITEM	GRADE	LOW SES PUPILS						HIGH SES PUPILS						SOURCE SYMBOL
		READING GAINS		ARITHMETIC GAINS		AFFECTIVE GAINS		READING GAINS		ARITHMETIC GAINS		AFFECTIVE GAINS		
		complexity		complexity				complexity		complexity				
		low	high	low	high	school	self	low	high	low	high	school	self	
Proportion of teacher-initiated work contacts that involve "mere" observation	II-III		L						H	L	L			BE P148
Long feedback on pupil-initiated work contacts	II-III	H						L						BE 168
Proportion of teacher-initiated work contacts that involve long feedback	II-III		H	L	M				L	L	M			BE P150
Teacher attends pupil closely in task setting	I	H[1]	L[2]	H[1]	L[2]									S73 FLA8
Teacher attends pupil closely	III-VIII		L[1]						L[1]					WGC FLA

Table 27 - TEACHER MOBILITY

BEHAVIOR ITEM	GRADE	LOW SES PUPILS			HIGH SES PUPILS			SOURCE SYMBOL
		READING GAINS complexity	ARITHMETIC GAINS complexity	AFFECTIVE GAINS	READING GAINS complexity	ARITHMETIC GAINS complexity	AFFECTIVE GAINS	
		low high	low high	school self	low high	low high	school self	
Adult movement	III	H H	H H					SK 444a
Teacher stays at desk (self report)	II-III				L L			BE Q3
Teacher at desk--working or available	II		H^1			H^1		BTES AP
Teacher aloof, detached from pupil activities	II	H^1 H^2		H^3	H^1 H^2		H^3	WGC TP16
Positive pupil affect and free teacher movement	V	L^1			L^1			S73a F5

Table 28 - MISCELLANEOUS TEACHING TECHNIQUES

BEHAVIOR ITEM	GRADE	LOW SES PUPILS				HIGH SES PUPILS				SOURCE SYMBOL
		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		
		low	high	low	high	school	self	low	high	low	high	school	self	
Giving and receiving information	K-I		H^1		H^1									S72 TCB
Giving and receiving information	II	L^1	L^2	L^1	L^2									S73 TCB
Naming (pictures, objects, etc.)	II		L^1		L^1									S73 TCB
Teacher uses non-verbal communication skills	II		H^1				L^2		H^1				L^2	WGC FLA
Visual demonstration	II	H^1						H^1						BTES R20
Games	II				L^1						L^1			BTES R19
Teacher always gives instructions for follow-up seatwork (self report)	II-III		L						H					BE 85
Clear explanations (teacher explanation not followed by pupil question)	III-VIII			H^1	H^2	H^3				H^1	H^2	H^3		WGC OScAR
Teacher uses non-verbal communication skills	III-VIII	L^1						L^1						WGC FLA

Table 29 - MISCELLANEOUS TEACHING TECHNIQUES

BEHAVIOR ITEM	GRADE	LOW SES PUPILS						HIGH SES PUPILS						SOURCE SYMBOL
		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		
		low	high	low	high	school	self	low	high	low	high	school	self	
Variety of instructional contexts (i.e., groupings)	II	L^1	L^2	L^3	L^4			L^1	L^2	L^3	L^4			BTES WD4
Class grouped by skill needs	II				L^1						L^1			BTES WD
Class grouped by reading level	II		H^1						H^1					BTES WD
Teacher selects respondent before asking question	II-III	L						H						BE A1
Teacher calls on volunteer	II-III		M	L	L			H	M	H	M			BE A3
Teacher uses non-patterned turns	II-III		H						L					BE 27
Structuring comments at beginning and end of lesson	K-I			H^1						H^1				Perham
Structured learning with teacher	II	L	H	L	H									S73 CDR3

Table 30 - METHODOLOGICAL APPROACH TO THE TEACHING OF READING

BEHAVIOR ITEM	GRADE	LOW SES PUPILS			HIGH SES PUPILS			SOURCE SYMBOL
		READING GAINS complexity	ARITHMETIC GAINS complexity	AFFECTIVE GAINS	READING GAINS complexity	ARITHMETIC GAINS complexity	AFFECTIVE GAINS	
		low high	low high	school self	low high	low high	school self	
Using basal readers (self report) (basal reader method)	I	H						CRAFT log
Behavior resembles that of teacher using language experience approach (language experience method)	I	H						CRAFT OScAR
Behavior resembles that of teacher using language experience approach with audio-visual enrichment (language experience method with audio-visual enrichment)	I	H						CRAFT OScAR
Behavior resembles that of teacher using skills-centered approach (language experience method with audio-visual enrichment)	I	H						CRAFT OScAR
Behavior implementing language experience approach (phono-visual method)	II	L						CRAFT OScAR

(Continued)

Table 30 - Continued

BEHAVIOR ITEM	GRADE	LOW SES PUPILS			HIGH SES PUPILS			SOURCE SYMBOL
		READING GAINS complexity	ARITHMETIC GAINS complexity	AFFECTIVE GAINS	READING GAINS complexity	ARITHMETIC GAINS complexity	AFFECTIVE GAINS	
		low high	low high	school self	low high	low high	school self	
Behavior resembles that of teacher using language experience approach (basal reader method)	II	H						CRAFT OScAR
Behavior resembles that of teacher using language experience approach with audio-visual enrichment (language experience method with audio-visual enrichment)	II	L						CRAFT OScAR
Behavior resembles that of teacher using skill-centered approach (basal reader method)	II	L						CRAFT OScAR
Minutes/day in phonics activities (self report)	II	L						CRAFT log
Using experience chart	II	L						CRAFT log

Table 31 - TIME SPENT ON MANAGEMENT

BEHAVIOR ITEM	GRADE	LOW SES PUPILS						HIGH SES PUPILS						SOURCE SYMBOL
		READING GAINS		ARITHMETIC GAINS		AFFECTIVE GAINS		READING GAINS		ARITHMETIC GAINS		AFFECTIVE GAINS		
		complexity		complexity				complexity		complexity				
		low	high	low	high	school	self	low	high	low	high	school	self	
Managing behaviors	I		L^1			L^2			L^1			L^2		WGC OScAR
Controlling behavior	I		L											CRAFT OScAR
Time spent in transitions	II-III							M	M		M			BE8 (T4)
Number of times when pupils line up	II-III	L	L					L	L					BE Q87
Teacher provides feedback to pupil on his/her behavior	III-VIII	L^1	L^2	L^3	L^4			L^1	L^2	L^3	L^4			HGC FLA

Table 32 - MANAGEMENT SKILL I-III

BEHAVIOR ITEM	GRADE	LOW SES PUPILS				HIGH SES PUPILS				SOURCE SYMBOL
		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		
		low	high	low	high	school	self	low	high	low	high	school	self	
Control without criticism	I		H^1						H^1					WGC OScAR
Teacher maintains self-control	I		H^1			H^2	H^3		H^1			H^2	H^3	WGC FLA
Teacher uses variety of control techniques, non-verbal	II	H^1	H^2				L^3	H^1	H^2				L^3	WGC FLA
Proportion of management errors that are overreactions	II-III		H						L	H	H			BE R161
Teacher supports appropriate, ignores inappropriate, coping behavior	II		L^1	L^2					L^1	L^2				WGC CS10
Proportion of management errors that are errors in timing	II-III	L	L						L					BE R160

Table 33 - MANAGEMENT SKILL III-VIII

BEHAVIOR ITEM	GRADE	LOW SES PUPILS						HIGH SES PUPILS						SOURCE SYMBOL
		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		
		low	high	low	high	school	self	low	high	low	high	school	self	
Control without criticism	III-VIII		H^1			H^2	H^3		H^1			H^2	H^3	WGC OScAR
Teacher maintains self-control	III-VIII	H^1	H^2	H^3	H^4		H^5	H^1	H^2	H^3	H^4		H^5	WGC FLA
Teacher supports appropriate, ignores inappropriate, coping behavior	III-VIII		H^1						H^1					WGC CS10
Teacher uses variety of control techniques, verbal and non-verbal	III-VIII	L^1		L^2	L^3			L^1		L^2	L^3			WGC FLA
Supportive classroom management	III-VIII	L^1		L^2	L^3			L^1		L^2	L^3			WGC FLA

Table 34 - REBUKING BEHAVIOR

BEHAVIOR ITEM	GRADE	LOW SES PUPILS			HIGH SES PUPILS			SOURCE SYMBOL
		READING GAINS complexity	ARITHMETIC GAINS complexity	AFFECTIVE GAINS	READING GAINS complexity	ARITHMETIC GAINS complexity	AFFECTIVE GAINS	
		low high	low high	school self	low high	low high	school self	
Teacher hostility	I	L^1			L^1			WGC OScAR
Teacher rebukes, desists with inappropriate pupil behavior	I	L^1		L^2	L^1		L^2	WGC CS5
Negative motivation (language experience method with audio-visual enrichment)	I	L						CRAFT OScAR
Negative motivation (phono-visual method)	II	L						CRAFT OScAR
Negative motivation (except language experience method with audio-visual enrichment)	II	L						CRAFT OScAR
Teacher hostility	III-VIII	L^1		L^2 L^3	L^1		L^2 L^3	WGC OScAR
Teacher rebukes, desists with inappropriate pupil behavior	III-VIII		H^1 H^2	L^3		H^1 H^2	L^3	WGC CS5
Teacher criticisms, rebukes, desists	III-VIII	L^1		L^2 L^3	L^1		L^2 L^3	WGC OScAR
Dominative teaching style with control through shame, ridicule, and threat	IV,VI				L		L	Sp F2
Teacher warns pupil	IV					L L		GG

Table 35 - DISRUPTIVE PUPIL BEHAVIOR

BEHAVIOR ITEM	GRADE	LOW SES PUPILS						HIGH SES PUPILS						SOURCE SYMBOL
		READING GAINS		ARITHMETIC GAINS		AFFECTIVE GAINS		READING GAINS		ARITHMETIC GAINS		AFFECTIVE GAINS		
		complexity		complexity				complexity		complexity				
		low	high	low	high	school	self	low	high	low	high	school	self	
Teacher talks over pupil noise	I	H												Bemis T1
Hyperactive pupil behavior	I	H												Bemis P2
Disruptive pupil behavior	I	L												Bemis P1
Pupil negative affect	I-II	L^1		L^1										S73 FLA7
Negative pupil behavior	II			L^1	L^2					L^1	L^2			BTES AP
Inappropriate pupil talk	II		L^1						L^1					BTES AP
Reduced deviant behavior	II				L^1	H^2					L^1	H^2		WGC FLA
Freq. discipline problems attributed to lack of interest (self report)	II-III			L						L				BE Q2
Reduced deviant behavior	III-VIII	H^1	H^2			H^3	H^4	H^1	H^2			H^3	H^4	WGC FLA
Inappropriate pupil talk	V				L^1						L^1			BTES AP

Table 36 - PUPIL INVOLVEMENT

BEHAVIOR ITEM	GRADE	LOW SES PUPILS						HIGH SES PUPILS						SOURCE SYMBOL
		READING GAINS		ARITHMETIC GAINS		AFFECTIVE GAINS		READING GAINS		ARITHMETIC GAINS		AFFECTIVE GAINS		
		complexity		complexity				complexity		complexity				
		low	high	low	high	school	self	low	high	low	high	school	self	
Pupil not responding to adult	III	H		H	H									SK 544c
Absence of withdrawn behavior	II			L[1]						L[1]				WGC FLA
Pupil calls out answer to teacher question	II-III		L						H					BE A4
Pupil on task, actively involved	III-VIII		H[1]						H[1]					WGC FLA
Pupils on task, involved	III-VIII		H[1]	H[2]					H[1]	H[2]				WGC TP3, 10
Absence of withdrawn behavior	III-VIII		H[1]			H[2]			H[1]			H[2]		WGC FLA
Pupil joins in class or group activity	V		L[1]			L[2]			L[1]			L[2]		BTES AP
Pupil attentive to subject of lesson	V			H[1]						H[1]				BTES AP

Table 37 - PUPILS SPEAK FREELY

BEHAVIOR ITEM	GRADE	LOW SES PUPILS				HIGH SES PUPILS				SOURCE SYMBOL
		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		
		low	high	low	high	school	self	low	high	low	high	school	self	
Pupils permitted to speak freely	II			L^1						L^1				WGC FLA
Pupils speak freely	II	L^1	L^2					L^1	L^2					WGC OScAR
Teacher encourages pupils to speak freely	II				H^1						H^1			WGC TP7, 15
Social interaction among pupils	III				H									SK 234
Verbal interaction among pupils	III			L	L									SK 476c
Teacher listens while pupils interact	III-VIII						L^1						L^1	WGC OScAR
Teacher encourages pupils to speak freely	III-VIII	L^1				H^2	L^3	L^1				H^2	L^3	WGC TP7, 15
Pupils speak freely	IX,XII		H^1						H^1					WGC OScAR

Table 38 - POSITIVE AFFECT

BEHAVIOR ITEM	GRADE	LOW SES PUPILS						HIGH SES PUPILS						SOURCE SYMBOL
		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		
		low	high	low	high	school	self	low	high	low	high	school	self	
Teacher positive affect (enthusiastic, friendly, etc.)	I	H^1	H^2	H^1	H^2									S73 FLA9
Pupils happy, positive attitude and climate	II	H^1	H^2	H^1	H^2									S73 CDR2
Percent of management requests followed by thanks	II-III			-						L				BE P154
Pupil pride, cooperation vs. apathy, fear, etc.	II				L^1					L				WGC OScAR
Pupils enjoy class	II			L^1						L^1				WGC FLACCS
Teacher develops "we" feeling	II	L^1						L^1						WGC FLACCS
Teacher develops "we" feeling	III-VIII	H^1				H^2		H^1				H^2		WGC FLACCS
Pupils enjoy class	IX-XII		L^1			H^2	H^3		L^1			H^2	H^3	WGC FLACCS

Table 39 - REINFORCEMENT

BEHAVIOR ITEM	GRADE	LOW SES PUPILS				HIGH SES PUPILS				SOURCE SYMBOL
		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		
		low	high	low	high	school	self	low	high	low	high	school	self	
With token--task-related, non-academic achiever	I	H	H											SK 401a
With token--all	I					H	H							SK 469a
"Smiles", gold stars, etc. (self report)	II-III	L	L					L	L					BE Q46
Special privileges (self report)	II-III	L	L					H	H					BE Q47

Table 40 - PRAISE

BEHAVIOR ITEM	GRADE	LOW SES PUPILS				HIGH SES PUPILS				SOURCE SYMBOL
		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		
		low	high	low	high	school	self	low	high	low	high	school	self	
All adult praise	I			H	H									SK 398a
Positive motivation (with language experience method)	I	H												CRAFT OScAR
Positive motivation (with language experience method)	II		H											CRAFT OScAR
Positive motivation (with skills-centered method)	II	L												CRAFT OScAR
Public praise as motivation for others (self report)	II-III	H	H					H	H					BE Q39
Praise in pupil-initiated work contacts	II-III		H						L					BE P133
Ratio of praise to praise-plus-criticism (in reading groups)	II-III	H	H					L	L					BE Q155
Ratio of praise to praise-plus-criticism (general)	II-III	L	L	M				M	M	M				BE Q155
Praise after pupil response	IV									L	L			GG

Table 41 - DEPENDENT PUPIL BEHAVIOR

BEHAVIOR ITEM	GRADE	LOW SES PUPILS			HIGH SES PUPILS			SOURCE SYMBOL
		READING GAINS complexity low high	ARITHMETIC GAINS complexity low high	AFFECTIVE GAINS school self	READING GAINS complexity low high	ARITHMETIC GAINS complexity low high	AFFECTIVE GAINS school self	
Pupil asks for help, teacher gives it	I	L						Bemis T5
Pupils seek and get support from teacher	I		L^1			L^1		WGC CS6
Pupils seek and get support from teacher	II	H^1	L^2		H^1	L^2		WGC CS6
Pupils seek and get support from teacher	III-VIII	H^1		L^2	H^1		L^2	WGC CS6

BEHAVIOR ITEM	GRADE	LOW SES PUPILS						HIGH SES PUPILS						SOURCE SYMBOL
		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		
		low	high	low	high	school	self	low	high	low	high	school	self	
Non-academic direct questions, requests, commands to individual pupils	III			L	L									SK 352a
Teacher non-substantive talk, pupils interested	II	L^1	L^2					L^1	L^2					WSC CS4
Pupil responses, non-academic	III			L	L									SK 359a

Table 43 - PERMISSIVE TEACHER BEHAVIOR

BEHAVIOR ITEM	GRADE	LOW SES PUPILS						HIGH SES PUPILS						SOURCE SYMBOL
		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		READING GAINS complexity		ARITHMETIC GAINS complexity		AFFECTIVE GAINS		
		low	high	low	high	school	self	low	high	low	high	school	self	
Pupil choice of activities vs. teacher-structured activities	I-II	L^1		L^1										S73 TP5
Permissive teacher behavior	II	L^1	L^2		L^3			L^1	L^2		L^3			WGC OScAR
Proportion of pupil requests not granted	II-III		H						M	M				BE P142
Pupils speak aloud without asking permission	II	L^1	L^2					L^1	L^2					WGC FLA
Proportion of pupil-initiated work contacts delayed	II-III	H						H						BE P136
Permissive teacher behavior	III-VIII			L^1	L^2					L^1	L^2			WGC OScAR
Teacher control, structure vs. permissiveness, spontaneity	IV							H	H	H	H			SoK

FUTURE DIRECTIONS FOR PROCESS-PRODUCT RESEARCH

The results reported in this study are both encouraging and discouraging. It is encouraging to find that the use of the process-product model has yielded so many consistent indicators of how effective teachers behave; clearly this kind of research can increase, and has increased, the knowledge base for teacher education. But it is discouraging to note how small the contribution, how slow the increase has been. Are there any steps that can be taken to increase the productivity of research based on this model without abandoning it?

Under the assumption that the goal of research in teacher effectiveness is to strengthen the knowledge base for teacher education, there are at least two steps that should be taken. One involves a change in *priorities*--in the way in which process variables are chosen for study; the other involves a change in *strategy*--a modification in the model itself. And the implementation of these two steps implies closer collaboration between the teacher educator and the researcher than we have seen in the past. The knowledge and resources that each possesses must be brought together in a unified effort.

New Priorities for Research in Teacher Effectiveness

One consequence of the lack of such collaboration in the past can be seen by comparing a list of the teacher behavior (process) variables studied by the researchers with the list of competencies that define the objectives of a competency-based teacher education program. By and large, the researchers do not seem to be studying the teacher behaviors that the educators regard as important. There is overlap, but the lists are far from congruent.

This has two implications, both of them bad. First, we lose the important contribution the teacher educator could make to selecting for study those teacher behaviors likely to characterize effective teachers. And second, the results the researcher gets would have much more direct implications for teacher education if they involved the competencies teacher education programs seek to develop directly. Their relevance would be obvious; and negative findings (which, alas, are far more common than positive ones) would be almost as useful as positive findings.

Some data from one study reviewed in this paper (WGC) were recently scored to yield measures of a typical set of competencies, and correlations between the competencies and a number of measures of pupil learning were estimated (Lorentz, 1977). More than 70% of the significant correlations found were negative, indicating that the more "competent" a teacher was, the less his or her pupils learned from that teacher.

Findings from this study have not yet been verified; if they should be, we would be forced to conclude that as teacher educators we are not merely ignorant but misinformed about what makes an effective teacher. Perhaps the most disturbing aspect of the present state of affairs is that at present we do not know *which* we are.

If there is any danger that similar results would be obtained in other sites, then the need for more of this kind of research is indeed urgent. The

implication that most of what we train teachers to do may tend to *decrease* their effectiveness is certainly alarming. But even if these findings are disregarded, the fact that we do not really know whether what we teach pre-service teachers makes them more effective is intolerable.

The way out of this situation is for future process-product research to use as process variables the same competencies that the teacher education programs are trying to help teachers acquire. Researchers and teacher educators should get together to investigate the validity of the latter's program goals.

If the information thus developed were used as the basis for program revision, and if the researcher continued to study the revised objectives in the same way, the result would amount to a large-scale, continuous experiment in teacher education. Such an experiment--or better yet, a number of them linked to several teacher education programs--would have at least two important effects. First, it would directly improve the effectiveness of the program studied. And second, it would add as much to our understanding of the dynamics of effective teaching--or more--than any amount of the one-shot, process-product research that is the present norm. This shift in priorities would make it possible for the research to be based on routine assessments of teacher competence at various levels of development--assessments that are, or ought to be, an integral part of any CBTE program.

Levels of Assessment in Teacher Education

Figure 1 shows four points or levels at each of which teacher effectiveness has been or may be assessed. The horizontal arrows joining the boxes represent lines of influence. Thus, the *training experiences* provided in a teacher education program are intended to change the *performance competencies* of a teacher in ways that will result in changes in the *learning experiences* pupils have, which will in turn change *the pupil outcomes* (hopefully, for the better).

There are, of course, many other important factors which affect pupil outcomes (such as pupil and community characteristics) that are not under the teacher's influence or control. Because the present focus is on the effect of teacher education on teacher competence, and for the sake of simplicity, these factors are not shown in the diagram.

In most states, teacher effectiveness is assessed for certification purposes at the level of *training experiences*. In order to be certified, a teacher must have completed an "approved program." The basic innovation proposed in competency-based teacher education is to base this decision on assessment at the next level--to certify teachers on the basis of demonstrated *performance competencies*. However, the essential idea behind the pressure for "teacher accountability" is that teachers should be assessed at the level of *pupil outcomes*. The trouble with this idea is that it is based on a fallacious assumption. It assumes that the lines of influence shown in Figure 1 can be read backwards as lines of responsibility. If the many other factors that influence pupil outcomes were shown in the diagram, the fallacy would be obvious.

Oddly enough, nobody seems to have advocated the assessment of teacher competency on the basis of *learning experiences* the teacher provides for pupils. The use that the teacher makes of pupils' time seems a more defensible

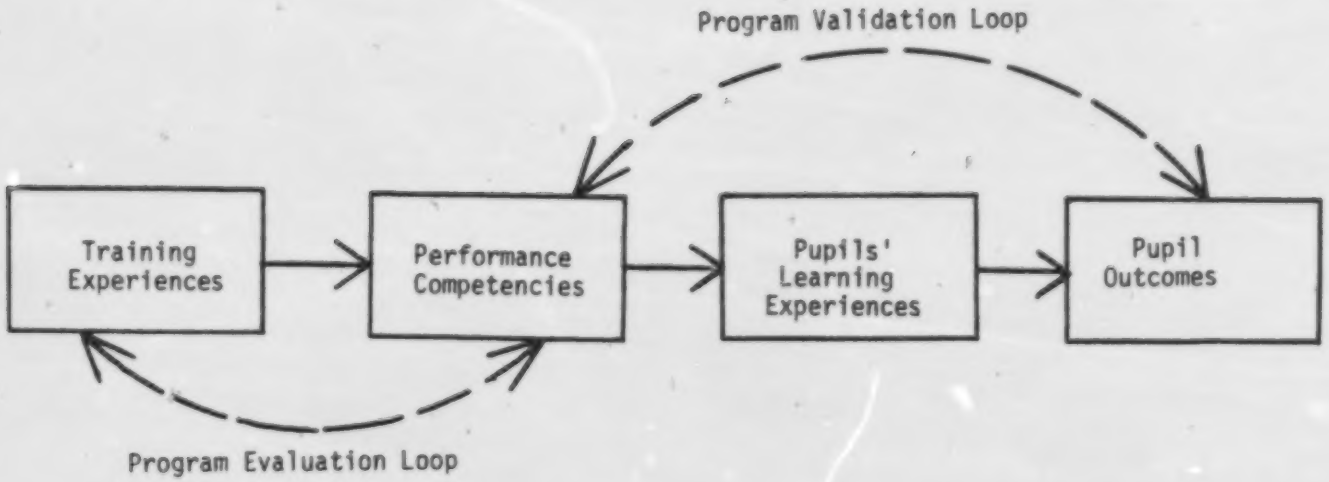

FIGURE 1. LEVELS OF ASSESSMENT OF TEACHER COMPETENCE IN TEACHER EDUCATION

This figure is adapted from p. 12 in Donald M. Medley, Robert S. Soar, and Ruth Soar, Assessment and Research in Teacher Education: Focus on PBTE, for the AACTE Committee on Performance-Based Teacher Education (Washington, D.C.: American Association of Colleges for Teacher Education, June 1975).

focus of accountability than the outcomes obtained--if for no other reason than that the teacher has much more control over it.

In program evaluation (see Figure 1), teacher educators examine the relationships between the *training experiences* teachers have and the *performance competencies* they exhibit in the classroom. To the extent that the training experiences produce the competencies defined as objectives of the training program, the program is evaluated as effective.

In order to evaluate, or validate, program objectives, teacher educators examine the relationships between the *performance competencies* a teacher exhibits and the (mean) *pupil outcomes* in his or her class. If those teachers displaying a particular competency produce greater pupil gains than those not displaying it, that competency is regarded as a valid objective. It should be noted that if our suggestion about research priorities were implemented, program validation and conventional process-product research would become two names for the same activity.

Future Strategy for Process-Product Research

Figure 1 also reminds us that it is the learning experiences each pupil has which determine pupil outcomes. Thus, to the extent that different pupils in the same classroom have different learning experiences, the learning outcomes also differ from pupil to pupil.

It seems important, then, to study the relationships between the learning experiences a pupil has (pupil behavior while under the care of a teacher) and pupil outcomes (what the pupil learns). These relationships have, of course, been the object of considerable study in the past, called *research in classroom learning*.

It seems equally important to study the relationships between teachers' performance competencies (teachers' behavior while teaching) and their pupils' learning experiences (pupils' behavior while under the teachers' care). Such research could well be called *research in teacher competence*.

It is perhaps time to consider whether the process-product model as we know it may not have outlived its usefulness, if for no other reason than that it ignores two critical variables almost completely: the intent of the teacher, and the behavior of the individual pupil.

As the model is implemented, the process variable--the classroom behavior measurement--is obtained without regard to the purpose or intent of the teacher. The amount of praise used by a teacher (for instance) is typically assessed by observing the teacher on a number of occasions chosen to approximate a random sample of the teacher's behavior during the year. No attempt is made to ascertain when or for what purposes a teacher uses praise or avoids it.

It seems obvious to anyone who has taught, or studied the behavior of teachers, that when or for what purposes teachers use praise is at least as important as how much, in distinguishing effective from ineffective teachers; just as when and for what purposes physicians administer cortisone is at least as important to their success as how often they administer it.

In the conventional application of the process-product model, it is also the practice to relate teacher behavior to the mean gain of the pupils in a class. It seems obvious that, even when allowances are made for preexisting pupil differences, different pupils in the same classroom learn different amounts. Use of the class mean as a product measure ignores these differences.

It is one of the truisms of education that learning results from the activity of the learner--a truism that receives considerable lip service but is usually disregarded in practice. The process-product model in effect assumes that learning results from the activity of the teacher. Granted that the very premise of teacher education is that teacher behavior affects learning. But this effect is indirect. Teacher behavior can affect learning only through its effects on learner behavior. The teacher teaches, but the pupil learns.

Somehow, in future research in teacher effectiveness, we must find and use a model in which the teacher's intent or purpose and the behavior of the individual pupil both play a part.

Perhaps the answer will involve the description or assessment of teacher purpose, meaning the learning experiences teachers intend their pupils to have; and instead of correlating teacher behaviors with outcomes, we will correlate teacher behaviors with pupil behaviors. The competent teacher would be the teacher who can behave in such a way that pupils have the learning experiences the teacher intends them to have--prescribes for them, if you will.

There is a second component in teacher competence, of course: the prescribed learning experiences must be those that maximize pupil learning outcomes: the competent teacher must, then, be able to diagnose pupil needs--to recognize what each pupil needs to do in order to learn.

Teacher competence thus involves a knowledge component--knowledge of relationships between pupil behaviors and learning outcomes; and a performance component--the ability to act, to behave, in ways that will help pupils exhibit these behaviors, have these learning experiences.

Research in teacher effectiveness might split, then, into two phases: the study of teacher behavior in relation to pupil behavior, and the study of pupil behavior in relation to pupil learning outcomes.

It would seem much more productive if the principal focus of future research were on correlations between teacher behaviors and pupil behaviors, that is, between competencies and learning experiences, rather than on correlations between teacher behaviors and outcomes. The former correlations should be much easier to detect.

At the same time, the secondary focus should be on correlations between pupil behaviors and pupil outcomes. Our understanding of the dynamics of effective teaching should increase much more rapidly if this strategy were to be adopted. And there is no reason why data collected for these purposes cannot also be analyzed to yield process-product correlations--the correlations between teacher competencies and pupil learning outcomes that are, and must remain, the primary basis for program validation.

In this way, the close collaboration between the researcher and the teacher educator we have advocated above can produce maximum improvement in the effectiveness of teacher education programs while (instead of after) developing the solid research base that seems so far out of reach today.

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APPENDICES

APPENDIX A

DETAILS ON STUDIES USED

SYMBOL	STUDY
BE	Brophy, Jere E. and Evertson, Carolyn M. *Process-Product Correlations in the Texas Teacher Effectiveness Study: Final Report.* Austin: University of Texas at Austin, June 1974.

PROCESS MEASURES

Brophy-Good Dyadic Observation System

OUTCOME MEASURES

Reading	High	Metropolitan Achievement Test Word Knowledge Reading
	Low	Metropolitan Achievement Test Word Discrimination Spelling
Arithmetic	High	Metropolitan Achievement Test Arithmetic Reasoning
	Low	Metropolitan Achievement Test Arithmetic Computation

SAMPLE

Grade Level II-III
28 classrooms of High and Low SES

SYMBOL	STUDY
Bemis	Bemis, Katherine A. and Luft, Max. "Relationships Between Teacher Behavior, Pupil Behavior and Pupil Achievement." In Anita Simon and E. G. Boyer, eds. Mirrors for Behavior: An Anthology of Observation Instruments Continued. 1970 Supplement, Vol. A. Philadelphia: Research for Better Schools, 1970.

PROCESS MEASURES

Southwestern Cooperative Educational Laboratory
Interaction Observation Schedule (SCIDS)

OUTCOME MEASURES

Reading	Low	Lee-Clark Reading Readiness Test
		Concepts
		Letter Symbols
		Word Symbols
		Total

SAMPLE

Grade Level I
15 classrooms of Low SES

SYMBOL	STUDY
BTES	McDonald, Frederick J. and Elias, Patricia. *The Effects of Teaching Performance on Pupil Learning.* Beginning Teacher Evaluation Study: Phase II, 1973-74. Final Report: Vol. I. Princeton, N.J.: Educational Testing Service, 1976.

PROCESS MEASURES

Anecdotal Process for Promoting the Learning Experience (APPLE)
Reading and Mathematics Observation System (RAMOS)
Work Diary (WD)

OUTCOME MEASURES

Reading	High	California Achievement Test, Reading Comprehension, Level 2, Form A
		Reading Application
		Reading Achievement
	Low	Decoding*
		Pictures--Sound Correspondence
		Rhymes
		Word Recognition
		Sight Words
		Root Words
		Words from Root Words
		Word Sounds
Arithmetic	High	California Achievement Test, Mathematics Concepts, Level 2, Form A
		Mathematics Application
	Low	California Achievement Test, Mathematics Computation, Level 2, Form A
Attitude	School	Attitude Toward Mathematics

SAMPLE

Grade Level II
41 classrooms of High and Low SES

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*Specially developed for the study by ETS.

BTES

OUTCOME MEASURES

Reading	High	California Achievement Test, Reading Comprehension, Level 3, Form B Reading Application Reading Achievement
	Low	Decoding* Word Sounds 1 First Syllable Last Syllable Root Words Words from Root Words Word Sounds
Arithmetic	High	California Achievement Test, Mathematics Computation, Level 3, Form B Mathematics Application
	Low	California Achievement Test, Mathematics Concepts, Level 3, Form B
Attitude	School	Attitude Toward Reading Attitude Toward Mathematics

SAMPLE

Grade Level V
54 classrooms of High and Low SES

*Specially developed for the study by ETS.

SYMBOL	STUDY
CRAFT	Harris, Albert J. and Serwer, Blanche L. *Comparison of Reading Approaches in First-Grade Teaching with Disadvantaged Children. (The CRAFT Project).* (Cooperative Research Project No. 2677). New York: Division of Teacher Education, The City University of New York, 1966.

PROCESS MEASURES

The Daily Log Form (Log)
Observational Scale and Rating-Reading (OScAR R)

OUTCOME MEASURES

Reading	High	Stanford Primary I Battery Form X Word Knowledge Paragraph Meaning Vocabulary Word Study Skills

SAMPLE

Grade Level I
48 classrooms of Low SES

SYMBOL	STUDY
CRAFT	Harris, Albert J.; Morrison, Coleman; Serwer, Blanche and Gold, Lawrence. *A Continuation of the CRAFT Project--Comparing Approaches with Disadvantaged Negro Children in Primary Grades.* New York: Division of Teacher Education, The City University of New York, January 1968.

PROCESS MEASURES

The Daily Log Form (Log)
Observational Schedule and Rating-Reading (OScAR R)

OUTCOME MEASURES

Reading	High	Metropolitan Advanced Primary, Form C Word Knowledge Reading
	Low	Metropolitan Primary II, Battery Word Discrimination Spelling

SAMPLE

Grade Level II
38 classrooms of Low SES

SYMBOL	STUDY
GG	Good, Thomas L. and Grouws Douglas A. *Process-Product Relationship in Fourth Grade Mathematics Classrooms.* Columbia: University of Missouri, October 1975. (Final Report to the National Institute of Education).

PROCESS MEASURES

Brophy-Good Dyadic Interaction System

OUTCOME MEASURES

Arithmetic	High	Iowa Tests of Basic Skills Mathematics Concepts Mathematics Problem-Solving
	Both	Iowa Tests of Basic Skills Total Mathematics

SAMPLE

Grade Level IV
41 classrooms of High SES

SYMBOL	STUDY
Perham	Perham, Bernadette H. "A Study of Multiple Relationships Among Teacher Characteristics, Teaching Behaviors and Criterion-Referenced Student Performance in Mathematics." Unpublished doctoral dissertation, Northwestern University, 1973.

PROCESS MEASURES

Sign System Observation Schedule

OUTCOME MEASURES

Arithmetic	Low	DMP Topic Inventories, Level 1, Forms 1 and 2*

SAMPLE

Grade Level K-I
11 classrooms of High and Low SES

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*Specially developed for the study.

SYMBOL	STUDY
S66	Soar, Robert S. An Integrative Approach to Classroom Learning. Philadelphia, Pa.: Temple University, 1966.

PROCESS MEASURES

South Carolina Observation Rating (SCOR)
Flanders' IA (Interaction Analysis)

OUTCOME MEASURES

Reading	High	Iowa Test of Basic Skills Vocabulary Reading
Arithmetic	High	Iowa Test of Basic Skills Arithmetic Problems
	Both	Iowa Test of Basic Skills Arithmetic Total
	Low	Iowa Test of Basic Skills Arithmetic Concepts
Attitude	School	My Class Inventory

SAMPLE

Grade Level III-VI
57 classrooms of High SES

SYMBOL	STUDY
S72	Soar, Robert S. and Soar, Ruth M. "An Empirical Analysis of Selected Follow Through Programs: An Example of a Process Approach to Evaluation." In Ira J. Gordon, ed. Early Childhood Education. Part II. The Seventy-First Yearbook of the National Society for the Study of Education. Chicago: NSSE, 1972.

PROCESS MEASURES

Florida Affective Categories System (FLAC)
Teacher Practices Observation Record (TPOR)
Florida Taxonomy of Cognitive Behavior (TCB)
Reciprocal Category System (RCS)

OUTCOME MEASURES

Reading*	Metropolitan Readiness Test Word Meaning Matching Listening Copying Metropolitan Readiness Test Alphabet Early Childhood Inventory (Deutsch) Alphabet
Arithmetic*	Metropolitan Readiness Test Numbers Early Childhood Inventory (Deutsch) Numerals Early Childhood Inventory (Deutsch) Shape Names

SAMPLE

Grade Level K-I
70 classrooms of Low SES

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*High and low complexity outcomes were measured on factor scores across all tests of both subjects.

SYMBOL	STUDY
S73	Soar, Robert S. *Follow Through Classroom Process Measurement and Pupil Growth (1970-1971).* Final Report. Gainesville: College of Education, University of Florida, 1973.

PROCESS MEASURES

Florida Climate and Control System (FLACCS)
Teacher Practices Observation Record (TPOR)
Reciprocal Category System (RCS)
Florida Taxonomy of Cognitive Behavior (TCB)
Global Ratings and Classroom Description Factors (CDR)

OUTCOME MEASURES

Reading*		Lee-Clark Reading Readiness Test
		Matching Letters and Words
		Wide Range Achievement Test
		Spelling from Dictation
		Word Reading Aloud
		Metropolitan Readiness Test
		Matching
		Copying
		Experimental Sponsor Items**
		Order of Alphabet
		Wide Range Achievement Test
		Naming Letters
		Recognizing 2 Letters
		Metropolitan Readiness Test
		Alphabet
		Early Childhood Inventory
		Alphabet
Arithmetic*		Wide Range Achievement Test
		Solving Problems
		Written Computation
		Metropolitan Readiness Test
		Numbers
		Wide Range Achievement Test
		Counting 15 Dots
		Experimental Sponsor Items**
		Count Numbers
		Write Numbers
Attitude	School	Days Absent

SAMPLE

Grade Level K-I
130 classrooms of Low SES

---

*High and low complexity outcomes were measured on factor scores across all tests of both subjects.
**Specially developed for the study.

S73

OUTCOME MEASURES

Reading*		Metropolitan Readiness Test
		Word Meaning
		Matching
		Experimental Sponsor Items**
		Opposites
		Verbal Opposites
		Similarities
		Absurdities
		Word and Phrase Reading
		Reading Sounds
		Story Reading
		Comprehension
		Stanford Achievement Test
		Word Reading 1-10
		Word Reading 10-20
		Wide Range Achievement Test
		Spelling
		Word Reading Aloud
		Wide Range Achievement Test
		Naming 13 Letters
		Experimental Sponsor Items**
		Days of Week
Arithmetic*		Metropolitan Achievement Test
		Arithmetic Computation
		Experimental Sponsor Items**
		Reading Numerals
		Wide Range Achievement Test
		Which Is More
		Written Computation
		Metropolitan Readiness Test
		Numbers
Attitude	School	Days Absent

SAMPLE

Grade Level II
20 classrooms of Low SES

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*High and low complexity outcomes were measured on factor scores across all tests of both subjects.
**Specially developed for the study.

SYMBOL	STUDY
S73a	Soar, Robert S. and Soar, Ruth M. *Classroom Behavior, Pupil Characteristics and Pupil Growth for the School Year and the Summer.* Gainesville: College of Education, University of Florida, December 1973.

PROCESS MEASURES

Florida Climate and Control System (FLACCS)
Teacher Practice Observation Record (TPOR)
Reciprocal Category System (RCS)
Florida Taxonomy of Cognitive Behavior (Cog. Tax.)
Global Ratings (GR)

OUTCOME MEASURES

Reading	High	Iowa Tests of Basic Skills Reading Vocabulary
	Low	Iowa Tests of Basic Skills Spelling
Arithmetic	Both	Iowa Tests of Basic Skills Arithmetic Concepts
Attitude	School	Days Absent
Self-Concept	Self	How I See Myself

SAMPLE

Grade Level V
81 Classrooms of High and Low SES

SYMBOL	STUDY
SK	Stallings, Jane and Kaskowitz, D. *Follow Through Classroom Observation Evaluation 1972-1973. A Study of Implementation.* Menlo Park, Calif.: Stanford Research Institute, 1974.

PROCESS MEASURES

Classroom Information Instrument (COI)
--Classroom Summary Information (CSI)
--Physical Environment Information (PEI)
--Classroom Observation Procedure (COP)
  --Classroom Checklist (CCL)
  --Five-Minute Observation Preamble (PRE)
  --Five-Minute Observation (FMO)

OUTCOME MEASURES

Reading	Both	Metropolitan Achievement Test, Form F, Primary I Total Reading
	Low	Metropolitan Achievement Test, Form F, Primary I Word Analysis
Arithmetic	Both	Metropolitan Achievement Test, Form F, Primary I Mathematics

SAMPLE

Grade Level I
108 classrooms of Low SES

SK

OUTCOME MEASURES

Reading	Both	Metropolitan Achievement Test, Form F, Elementary Total Reading
	Low	Metropolitan Achievement Test, Form F, Elementary Language
Arithmetic	Both	Metropolitan Achievement Test, Form F, Elementary Total Mathematics
	High	Metropolitan Achievement Test, Form F, Elementary Mathematics Concepts Mathematics Problem-Solving
	Low	Metropolitan Achievement Test, Form F, Elementary Mathematics Computation
Attitude	School	Days Absent
Self-Concept	Self	Intellectual Achievement Responsibility Scale

SAMPLE

Grade Level III
58 classrooms of Low SES

SYMBOL	STUDY
SoK	Solomon, Daniel and Kendall, Arthur J. *Individual Characteristics and Children's Performance in Varied Educational Settings.* Rockville, Md.: Psychological Services Section, Montgomery County Public Schools, May 1976.

PROCESS MEASURES

Classroom Observation Form
Classroom Atmosphere Ratings

OUTCOME MEASURES

Reading	High	California Achievement Test, Reading Vocabulary Comprehension CAT Language Usage and Structure
	Low	California Achievement Test, Reading Capitalization Spelling
Arithmetic	High	California Achievement Test, Mathematics Concepts
	Low	California Achievement Test, Mathematics Computation
Attitude	School	Self-and-Class Evaluation*
Self-Concept	Self	Self-Esteem (adapted from Davidson and Greenberg)

SAMPLE

Grade Level IV
50 classrooms of High SES

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*Specially developed for the study.

SYMBOL	STUDY
Sp65	Spaulding, Robert L. *Achievement, Creativity, and Self-Concept Correlates of Teacher-Pupil Transactions in Elementary School Classrooms.* Hempstead, N.Y.: Hofstra University, 1965.

PROCESS MEASURES

Transaction Sample: Classroom (TSC)

OUTCOME MEASURES

Reading	High	Cooperative Sequential Tests of Educational Progress (STEP) Reading
Arithmetic	High	Cooperative Sequential Tests of Educational Progress (STEP) Mathematics
Self-Concept	Self	Self-Concept Inventory

SAMPLE

Grade Level IV, VI
21 classrooms of High SES

SYMBOL	STUDY
WGC (Carroll County/West Georgia College)	Coker, Homer; Lorentz, Jeffrey L. and Coker, Joan G. *Interim Report on Carroll County CBTC Project, Fall, 1976.* This report covers procedures for major analysis of first year (1974-75) data, reliabilities and correlations. Reported to Georgia State Department of Education, 1976.

PROCESS MEASURES

Coping Analysis Schedule for Educational Settings (CASES)
Spaulding Teacher Activity Rating Schedule (STARS)
Florida Classroom Climate and Control System (FLACCS)
Observation Schedule and Record Form 5 Verbal (OScAR)
Teacher Practices Observation Record (TPOR)

OUTCOME MEASURES

Reading	Both	Comprehensive Test of Basic Skills, Level B, Form S Total Reading
Arithmetic	Both	Comprehensive Test of Basic Skills, Level B, Form S Total Mathematics
Self-Concept	Self	I Feel Me Feel

SAMPLE

Grade Level I
Total of 60 classrooms of High and Low SES used in the study

MGC

OUTCOME MEASURES

Reading	High	Iowa Test of Basic Skills, Primary Battery, Level 7, Form 6 (ITBS-P) Vocabulary Reading Comprehension
	Low	Iowa Tests of Basic Skills, Primary Battery, Level 7, Form 6 (ITBS-P) Language Spelling
Arithmetic	High	Iowa Tests of Basic Skills, Primary Battery, Level 7, Form 6 (ITBS-P) Mathematics Concepts
	Low	Iowa Tests of Basic Skills, Primary Battery, Level 7, Form 6 (ITBS-P) Mathematics Computation
Self-Concept	Self	I Feel Me Feel

SAMPLE

Grade Level II
Total of 60 classrooms of High and Low SES used in the study

WGC

OUTCOME MEASURES

Reading	High	Iowa Tests of Basic Skills, Forms 5 and 6, Levels Edition (ITBS) Vocabulary Comprehension
	Both	Iowa Tests of Basic Skills, Forms 5 and 6, Levels Edition (ITBS) Total Language
Arithmetic	High	Iowa Tests of Basic Skills, Forms 5 and 6, Levels Edition (ITBS) Mathematics Concepts
	Both	Iowa Tests of Basic Skills, Forms 5 and 6, Levels Edition (ITBS) Total Mathematics
	Low	Iowa Tests of Basic Skills, Forms 5 and 6, Levels Edition (ITBS) Mathematics Computation

SAMPLE

Grade Level III-VIII
Total of 60 classrooms of High and Low SES used in the study

OUTCOME MEASURES

Self-Concept Self	I Feel Me Feel (IFMF)

SAMPLE

Grade Level III

OUTCOME MEASURES

Self-Concept Self	How I See Myself (HISM), Elementary

SAMPLE

Grade Level IV-VIII

WGC

OUTCOME MEASURES

Reading	Both	Tests of Academic Progress, Form S (TAP) Reading
Arithmetic	Both	Tests of Academic Progress, Form S (TAP) Mathematics
Attitude	School	Junior Index of Motivation (JIM)
Self-Concept	Self	How I See Myself (HISM), Secondary

SAMPLE

Grade Level IX-XII
Total of 60 classrooms of High and Low SES used in the study

APPENDIX B

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APPENDIX C

LETTERS AND COMMENTS

When the PBTE Committee commissioned this study, it also set up a review panel of research experts whose function was to read the first draft of the report and make comments or suggestions which were to be published with the report. The same draft was circulated to the principal investigators of those studies whose findings were used in the report, and their reactions were also solicited under the same terms. The responses are reproduced in this appendix, with the grateful acknowledgments of the author. He found them most useful in preparing the final version of the report, which includes changes made in response to some of these suggestions and comments.

113169

Comments by The American Federation of Teachers, AFL-CIO
Marilyn Rauth
Assistant Director, Education
Educational Research Dept., AFT
Washington, D.C. 20036

The American Federation of Teachers has long insisted that we need serious research on the "technology of teaching" to discover, if possible, what makes a competent teacher. We are in agreement with AACTE and many others that education would benefit from a knowledge of demonstrable skills and behaviors required of a competent teacher.

Of all the research studies examined, it is significant that only 12 were thought to have the validity required to be generalized among the teacher population in terms of assessment of teacher competencies. We are not sure whether these studies are truly comparable or why others have been left out. We are unconvinced that literature surveys of independently developed studies really tell us anything conclusive.

We would also argue that even the studies Dr. Medley does look at are flawed because of reliance on the process-product method. Dr. Medley states in his report that he infers "that a teacher who is effective is competent and that the one who is not is incompetent." Effectiveness is judged on the basis of student achievement on standardized tests. If the teacher were the sole influence on a child's learning, we could more easily accept these findings. But, obviously, this is not the case. The AFT has been arguing for years that studies which omit home background and many, many school-related variables are seriously deficient and basically worthless.

We recognize that Dr. Medley acknowledges that research on teacher effectiveness is still quite limited since he uses many qualifiers when talking about teacher competencies. We wonder if such extensive use of qualification is not simply one more indication of the inherent weakness of literature surveys.

If we are truly interested in ascertaining what constitutes effective teaching, we must continue to pursue honest research that will look at all variables involved, including such things as teacher performance, societal and economic effects, available resources, and environmental settings. Because of the expense and time involved in using such comprehensive approaches, they are generally rejected, and education moves forward in ignorance.

In our opinion, research on teacher competencies will not yield valuable results until all those involved in education, whether teachers, administrators, or politicians, admit that we cannot find solutions overnight and that all parties, including teachers and their unions, must be involved in the search for answers.

FAR WEST LABORATORY
For Educational Research and Development
1855 Folsom St., San Francisco, Calif. 94103

March 28, 1977

Dr. Karl Massanari
American Association of Colleges
for Teacher Education
One Dupont Circle
Washington, D.C. 20036

Dear Karl:

I thank you for letting me comment on the Medley Review. I admire Dr. Medley's stamina and agree with the premise...someone should turn these "findings" into usable ideas for teacher educators. In that spirit, I have no comments and congratulate you on the good sense to pick Dr. Medley, and I congratulate him on a job well done.

My concerns are not with the need for a review like this or the product, but with the problems in the field of research that any review worth the effort seems to raise. For example, the subtitle of the review is "A Compilation of Dependable Findings of Research in Teacher Education." I find little in this field that would lead me to call these findings dependable. The kinds of studies done by some of the investigators whose work met the standards of Medley, and I might add, my own present work, do *not* lead me to believe we have dependable results. We have some names and measurement instruments for some variables which should be thought about seriously as positively affecting student achievement. That's about as strong a statement as I would ever make. See for example the discouraging review of behavioral stability by Shavelson and Dempsey in RER this year.

Reviewing is an art that is starting to become technical and methodological. Gene Glass' work on statistical methodology for conducting meta-analysis of research in an area is an example of such new and sophisticated approaches to reviewing research. I think, were I you, I would continue to fund such reviews, every few years, because neither Medley's nor Rosenshine's, nor Heath's, nor Dunkin and Biddle's, etc., can capture the full knowledge in a field like this. And none of the above used the systematic approach of Glass for the accumulation of data. Somebody should!

I am also a little bothered by some of the criteria used by Dr. Medley. The criterion of a linear correlation of .39 in this review is quite sensible but certainly opens the review up to certain criticisms. These have to do with the sample size necessary to have a correlation of .39 be significant. At the .05 level this is, I think, about 18 cases. Since many, many interesting studies of teaching have low N's, they may never get into the "acceptable-for-review" category. This argument about size is made best by my friend and colleague N. L. Gage in his paper "four cheers for research on teaching."

Another problem is in the gain criterion, listed as criterion III. Gains are defined very differently in these studies. In at least one study used in this review, the "gain" is actually a loss of points between an easy pretest and a hard post test. Residualization is used in some but not all the studies, I think, and this too has unique problems.

I could nit-pick my way through 10 or more other areas, all of which are well known by Dr. Medley and the researchers whom he reviews.

My point in this brief critique is only to express my concern that you are not fooled. These are ideas to be thought about, propositions, if you will. But they are *not* "dependable" findings. Moreover, these studies will probably not be replicated or validated in anywhere like their original form. So someone needs to design mini-implementation studies to see if the variables seem to hold up on closer scrutiny. After these implementation types of studies, under different conditions, I might begin to use terms like "dependable." Till then, caution, caution! But if you will stay cautious, by all means use the review as a take off for the design of programs in teacher education. The review is certainly worth serious attention.

Sincerely yours,

David C. Berliner
Associate Laboratory Director
for Research

DCB:er
cc: Don Medley

P.S. Don--Can I keep my copy of the review and share it with the California Commission for Teacher Preparation and Licensing, even in its draft form? They should read it soon.

Thanks,

Dave

Comments by Jere Brophy
Associate Professor of Educational Psychology
University of Texas at Austin
Director of the "Correlates of Effective Teaching" Project
Research and Development Center for Teacher Education in Austin

Dr. Medley has produced a useful, thought-provoking compilation and integration of research on teacher effects. The rationale and procedures are clearly described, along with their implications, making it easy to understand and evaluate what was done. Also, the data are presented in a form that makes them easy to comprehend, something that is difficult to accomplish in a review of this magnitude. In general, the document is well done and stands as a valuable contribution. Having said this, I wish to offer a few criticisms and suggestions.

First, although the combined criteria of size of correlation (.39 or better) and probability value (.05 or below) highlight strong findings and eliminate borderline ones, I would not place too much stress on the sizes of correlations. In studies with many subjects, correlations lower than .39 still can be not only statistically significant but worth considering. More generally, replication across studies is more important than the correlations in any single study, so that I would nominate replication and consistency as the primary criteria for judging findings.

Similarly, I share Medley's concern with specific, describable behavior, but I would not rule out high-inference process measures from consideration. Many aspects of teaching are best measured with high-inference methods. Even if it is true that these measures are not very useful for teacher education until or unless broken into specifics, it still seems useful to take note of consistent findings concerning high-inference measures as a way to indicate areas likely to be worth finer analyses to lead to more specific, low-inference descriptions.

My major concern about the review is that so much emphasis has been placed on long-term outcomes and normative test data, even to the point of dismissing short-term outcomes (attention, task engagement, short-term rates or levels of achievement). Short-term outcomes are convincing in their own right, whether or not they correlate with long-term outcomes. In fact, they provide the linkages to explain why teacher behavior influences long-term outcomes, especially test performance that is not related in any direct way to the teaching behaviors of interest. Data on long-term outcomes are needed to show that the teacher behaviors have important effects, but short-term outcomes lead us towards explanation of how the processes work and provide evidence that correlational relationships reflect causal ones. Linkages between teaching behaviors and short-term outcomes are useful even in the absence of information about long-term outcomes, and linkages between teacher behaviors and long-term outcomes are incomplete.

The SES data discussed in the review come from my research, and I hasten to point out that SES was used as a proxy standing for some combination of ability, achievement level, and motivation. SES per se is not the basic variable, and overemphasizing it might lead to unfortunate fixation on methods and/or to increased stereotyping according to SES. Also, our data do not support the comment made about integration in any direct way, and I do not interpret them

that way myself. It may be true that integration (across race, social class, ability groups, or other classifications) alone does not help, but investigations of tracking consistently reveal that segregation does not help, either. The issue cannot be settled with data discussed in this report. It resolves to a complex trade-off between the benefits and disadvantages of homogeneous vs. heterogeneous classroom composition.

A final point about interpretation should be made in reference to the studies by the Soars and by Stallings and Kaskowitz. These used Project Follow Through classrooms. Follow Through sponsors have specific program models that differ considerably from one another, and teachers within programs tend to teach similarly. Therefore, process-product data from the studies in question do not so much reflect *teacher* effects as *program* effects. Sometimes, this leads to confusion. In particular, these studies are cited as supporting the idea that low SES children in the early grades learn best when taught in large rather than small groups. It happens that group size is inextricably confounded with program sponsorship in Follow Through classrooms: the programs that get the best learning gains use large groups, and certain others use small groups. It is possible that group size did have direct effects, but it is more likely that differences in effects resulted from differences in curricula, and that these correlated group size variables do not have any causal effects. In any case, it should be kept in mind that correlational data can suggest causality when, in fact, certain variables are just correlates of others that are the real causes, and that this danger is compounded in studies using Follow Through classrooms.

West Georgia College
Division of the University System of Georgia
Carrollton, Georgia 30117

March 25, 1977

Dr. Karl Massanari
Director, PBTE Project
American Association of Colleges for Teacher Education
One Dupont Circle
Washington, D.C. 20036

Dear Dr. Massanari:

Thank you for the opportunity to review and react to Dr. Donald Medley's The Research Base for Teacher Education.

Because of the way the study is organized and presented, it is surely the most definitive, straight-forward study of process/product relationships which has been done to date. The four criteria used in the selection of research studies to be included cannot be faulted. One might wish to alter any or all of them in some minor specific way(s), but they should stand the test of time and become the basis for identifying teacher behaviors which lead to important student growth. These important criteria could be expanded in either/or both directions for future research on teacher effectiveness.

It seems unlikely that anything less than long-term direct observation in the natural setting will yield the real relationships essential to the formulation of an empirically based teacher education program. Only research which attempts to study all the variables in their natural setting can possibly reveal insights into the progressive interactions which are present in classrooms. Additionally, Cohen's Statistical Power of Analysis provides evidence that increasing the size of n's is needed to yield the maximum number of real relationships which exist. It might be useful if this aspect of research could be reported.

The "folklore" definitions of teacher effectiveness of which Medley speaks still abound and must be dispelled. Since we do not have a definition of competent and/or incompetent teaching, the use of the terms "more effective" and "less effective" appear to be more appropriate and more acceptable.

All of the "Introduction" is extremely lucid, but the powerful "Rationale of the Study" should be required reading for every teacher educator in the nation.

This study is a landmark which is so desperately needed at this time.

Sincerely,

Homer Coker
Director of the Compe. ncy-
Based Teacher Certification
Project

Comments by Albert J. Harris
Professor of Education, Emeritus
New Rochelle, New York

Despite decades of effort and hundreds of studies, the training of teachers is still based more on tradition and personal belief than on hard research evidence. Dr. Medley has performed a great service in his effort to separate the wheat from the chaff in teacher effectiveness studies. The criteria he has used in deciding which results to include are stringent: sound research design; relationships which are practically as well as statistically significant; measured pupil gains as the criterion; results which can be generalized to other groups of teachers; and specific description of process, making the study repeatable. It is a pity that so few of the studies he searched met these criteria.

By grouping together the results of different studies he has uncovered many interesting trends, some of which run contrary to conventional wisdom. He has identified areas in which there is substantial consensus of evidence already, and other areas in which the evidence is meagre or inconsistent, thus providing direction for future research.

However, something is lost when the results of a complex study are boiled down to entries in a few tables. The descriptive labels in the tables may not always convey enough detail about the variable as it was defined in the study being cited. For example, the entries concerning the CRAFT Project, which I directed, are accurate as far as they go, but they do not include some essential information. In Medley's Table 7, a CRAFT result showing a negative relationship between total reading time and reading improvement in second grade is cited. This is correct; but it applied to only one of the four teaching methods studied in that project (the Phonovisual Method), and what it means is that in second grade the teachers who spent most time on phonic drills achieved less improvement in reading than the teachers who spent less time on such drills, in that particular method. Some of the other discrepant results may also be based on incomplete descriptions of variables.

Dr. Medley's finding that with some important variables what works well with middle-class children works poorly with low SES children, and vice versa, gives much food for thought. Hopefully, teacher educators will pay attention to this, and to other significant findings such as the poor results associated with small group work, and the positive relationship between time spent on reading instruction and reading results in first grade.

Comments by W. Robert Houston
Associate Dean
School of Education
University of Houston
Houston, Texas

This monograph makes several contributions to educational study. First, the monograph provides a model for summarizing the findings of research studies. In his procedures, Medley specified a set of stringent criteria, then applied them to teacher effects research, reporting only findings meeting these standards. These findings have been reported using a common format; thus, not only the author's conclusions but also his data base are made known to the reader.

Second, the tables and conclusions dramatically demonstrate the serious lack of empirical studies in this area, and the need for concerted effort systematically to investigate the effects of teaching behavior. To date there are no unifying theories in teaching as in the sciences, but neither are there substantiated findings upon which such theories could be built. In ancient Greece, for example, Thales' monumental conception of the universe was based on 500 years of observations by astronomers of the movement of the sun, planets, and stars. Likewise, the theories of Newton, Einstein, Galileo, and others were based on advancing technology in the measurement of phenomena and previous research in related fields.

While the patterns of findings in teacher education reported herein are far from clear, they provide a succinct basis for identifying needed areas for further study, stimulating research hypotheses, and understanding the relationships among studies. The interaction between increased precision in measuring instructional processes and learning outcomes and systemic research studies in teacher effectiveness encourage long-range study and theories based on empirical evidence.

Third, findings provide cautious cues for educating teachers today--cautious because the populations studied were primarily in the elementary school, cautious because the number of studies was small, cautious because of several seemingly contradictory findings, and cautious because studies were concerned only with reading and mathematics and may not apply to less skill-related subjects. However meager and inconclusive, such bases could be superior to typical practices based on lore which do not lend themselves to further refinement and study.

Comments by Virginia Koehler
Acting Chief, Teaching Division
National Institute on Education
Washington, D.C.

This is an extremely interesting document. Don Medley has produced a report which provides a well organized and easily understood compilation of "raw empirical findings" from a large number of complex studies. It will, I am sure, be utilized for its substance and as a model for organizing and presenting this type of data.

A critique of a research synthesis document inevitably begins with a comment on criteria utilized for inclusion. Actually, I have few problems with the criteria, except for the one which excludes short-term relationships under Criterion III. I can understand excluding such findings for the sake of parsimony or lack of comparability. But to state that short-term learning gains "are not the kinds of outcomes . . . that teachers are hired to accomplish" implies that one-year achievement gains on standardized tests are. As a researcher, as a parent, and as an ex-teacher, I would have to argue with this conclusion.

I would also have included a few more caveats in the descriptions of the studies. For example, there is a major problem with construct validity in the category systems of the multitude of observation measures represented in this paper. This means, among other things, that "teacher lectures" in one observation measure may not be the same as "teacher lectures" in another measure. (See Borich and Malitz, "Convergent and Discriminant Validation of Three Classroom Observation Systems: A Proposed Model", UTR&D, 1976). Another methodological problem is that many of the greater than .39 correlations listed in the tables were found in studies with many variables and many non-significant correlations, making the "significant" ones possibly random occurrences. (See Godbout, "The Problem of Change: Significant Findings in Educational Research," UTR&D, 1975.) Both of these problems may explain some of the contradictory findings.

But without a doubt, the most important caveat which needs to be emphasized throughout the report (and in fairness to Medley, he did make it at the beginning) is that these relationships are, in large part, correlational. Causal directions should not be inferred from these findings. Examine, for example, the following Medley conclusion: "...the effective teacher maintains an environment that is supportive, and if not always quiet, free from disruptive pupil behavior. He maintains this environment with little apparent effort or expression of negative affect." The tricky word here is "maintains". Is it not just as possible that the "effective" teacher happens to have few behavioral problem students in his/her class, and therefore does not need to exert effort--that, in fact an "ineffective" teacher may be one with an excess number of behavioral problem children in his/her class? Reality is probably somewhere between these two interpretations. But the data have been interpreted for us in a model which suggests that teacher behaviors affect student behaviors which in turn affect achievement gains. Experience, and some preliminary findings (e.g., Brophy, et al, "The Student Attributes Study: Preliminary Report", UTR&D, 1976) indicate that there is an interactive process at work: that certain student behaviors affect teacher behaviors and therefore outcomes, as well as the other way around.

The report also makes some provocative statements - statements which suggest additional analysis beyond the scope of this project. The most provocative question asked: "If there are many strategies which have opposite effects on pupils of these two types (or any others), is it fair to the pupils (or to the teachers) to mix them together in the same classroom?" The conflict indicated in the question is between notions of equal educational opportunity on the process side - i.e., treating all kids the same, and equal educational opportunity on the outcome side - i.e., taking cognizance of and acting upon trait - by - treatment interaction research findings. But this, I believe, is grist for another report.

In all, then, the report is extremely important in that it attempts to make sense of an incredibly complex set of findings without completely digesting these findings for the reader. Medley is to be congratulated for developing and utilizing such a model.

May 12, 1977

Donald Medley
Professor of Education
School of Education
University of Virginia
Charlottesville, Virginia 22903

Dear Don:

I have reviewed your compilation of interim research findings on research in teacher education. It is a superior piece of work, the best I have seen to date. Your choice of criteria for selecting studies to be included is excellent and you have done justice to the studies which are included. The approach for integrating the studies is excellent.

This research review is a significant addition to the literature on teacher effectiveness.

Sincerely yours,

Frederick J. McDonald
Executive Director
National Commission of
Performance-Based Education
Educational Testing Service
Rosedale Road
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Comments by R. S. Soar
Professor of Education
Institute for Division of Human Resources
College of Education, University of Florida
Gainesville

Without doubt, this review is potentially one of the most important things that has happened in teacher behavior research. The selection on an eminently rational basis of the studies to be reviewed reduces the volume of material to be dealt with to one which is manageable. But the major advance is the method of presenting results, in which findings which would have looked inconsistent under any other review method can be seen to be consistent instead. The fact that this procedure frees the reader from the frame of reference of the reviewer, and yet provides the data in manageable form, is a major advance over other reviews including those of this author.

The very success of the review, however, suggests further steps which would be useful. The easiest would be to include results of specific tests of interactions of teacher behavior with pupil socioeconomic status as they relate to outcome. If, for example, positive affect expression related to gain +.30 for low SES pupils, and -.30 for high SES pupils, this difference in direction of relationships would be an interaction which would account for enough variance to meet the review criteria, if explicitly tested; but the separate relationships as they are now reviewed would not. The importance of SES as a moderating variable in the review argues for the usefulness of reporting these explicit tests, even though they do not fit the organization of the current review.

The imposing volume of results in the review supports the decision to use a cutoff of 15% of variance. Larger amounts of data would probably place a greater demand on the reader than many would accept. But the success of this procedure suggests the usefulness of repeating the review using a lower cutoff, perhaps one of 10% variance. In our data, about half of the correlations between classroom regressed mean gain for different measures of achievement are less than .39 (15% variance). It seems unlikely that teacher behavior will often relate more strongly to achievement gain than another measure of achievement gain does, so that probably numbers of real relationships have been screened out.

Ultimately, it seems useful to examine this set of studies in more detail, either averaging effect-size for variables identified in the review, or pooling the independent probabilities from the various studies. The inclusion of specific tests of interactions might be done in the present review, but probably the inclusion of relationships with a cutoff of .3, or the more intensive analyses, should be made in additional studies.

There is an additional methodological problem which affects the results of the studies reviewed (as Ruth Soar brings to my attention). In calculating regressed gain, most studies only adjust the effect of pretest out of the posttest score, which typically holds constant about two-thirds of the variance (less if the interval is more than a year). In contrast, holding IQ and socioeconomic status constant, as well, typically holds 80-90% of the variance constant. This procedural difference has two probable effects: (a) adjusting only for pretest leaves a greater amount of reliable variance available to

relate to classroom behavior, but, unfortunately, (b) it probably biases the resulting relationships. The relations between pupil IQ and SES at the beginning of the year and teacher behavior at mid-year are often stronger than those between behavior and gain. As a consequence, if these pupil characteristics are not held constant, a spurious degree of relationship between teacher behavior and pupil post-score may be created. This problem is obviously not under the control of the reviewer, but it does seem worth pointing out, since the more carefully done studies are likely to produce fewer significant relationships and smaller ones. Perhaps this characteristic of each study could be cited as an annotation in the reference list. This also seems important to point out since this review will probably have continuing influence on the research done in the future.

But these suggestions should not be seen as detracting from the review--it is a contribution whose importance would be hard to overestimate. It will no longer be possible for reviewers or teacher educators to denigrate teacher behavior research as having nothing to contribute without their poor scholarship being evident; and this is doubly important, since the review makes clear that some of teacher education's most dearly held beliefs are irrelevant or even wrong.

Western Kentucky University
Office of the Dean
College of Education
Bowling Green, Kentucky

May 11, 1977

Dr. Donald Medley, Professor
College of Education
University of Virginia
Charlottesville, Virginia 22901

Dear Don:

Please forgive the long delay in my reaction to your excellent study of the research findings in teacher education. I think the work you have done is methodologically sound and your analyses of the findings are outstanding. I am disappointed, however, although no fault of your study, that the existing research was so limited that the results of your study will be limited in generalizability, i.e., generalizable primarily to grades I-III and in the subjects of reading and math. The implications will be powerful, however, for other grades and subject areas and should stimulate great amounts of research and new data.

I am particularly impressed with the finding that successful teacher behaviors differ so markedly between low SES and high SES groups. The implications for teacher education are startling. I wonder if these differences continue through the upper elementary grades and into high school? Your question as to whether we should mix SES's in the same classroom is truly meaningful in the light of your findings.

Equally impressive, and contrary to most people's opinion, was the finding that productive teachers do less individual work with students but when working individually, they use different techniques. Again, here is much food for thought in teacher education.

Perhaps one of my major concerns can be found on page 30 of the draft. I hope that readers will not overgeneralize the findings that the effective teacher of low SES's "does not encourage pupils to analyze, synthesize, evaluate, or indeed do anything but answer rather narrow questions asked by the teacher. The teacher who encourages such pupils to express themselves freely, to think, to question, to discuss is not effective in teaching them to read or do arithmetic." You have carefully pointed out that these findings apply only to reading and arithmetic, and presumably in lower elementary grades. Obviously, there will be those who will quote these findings and apply them to all areas of study, including the humanistic and social studies.

Although there are many impressive findings in the study that are worthy of comment, I want to mention only two more. First, I was pleased that your findings indicated that effective teachers used more praise, encouragement, and reinforcement than did more ineffective teachers. I have read some recent

research that denied this finding. I happen to believe that they do use more praise. Second, your findings suggest that effective teachers may be more authoritarian than the less effective. This is the first concrete evidence to support our data from the Teacher Preparation Evaluation Program at Western Kentucky University.

In summary, the more I read your paper, the more impressed I became with it. My first impressions were not nearly so supportive. I became "hung up" on the fact that the studies examined were so limited in number, dealt primarily with lower grade levels, and assessed progress in reading and mathematics. I still believe that these limitations should be pointed out. The beauty of your technique "grew" on me and your caution in interpreting the results is commendable. I support your work enthusiastically, but with the expectation that it will be misquoted and used out of context. Despite these probabilities, it is a highly valuable piece of work. Congratulations on a job well done.

Sincerely yours,

J. T. Sandefur, Dean
College of Education

Comments by Haroldie K. Spriggs, Ed. D.
Educational Program Specialist
DHEW - Office of Education
Teacher Corps

The report is designed to provide the teacher educator with access to the meaningful findings of research in teacher effectiveness. That such access is needed is unquestionable. That this report does the job outlined is also unquestionable. What is questionable is the impact this report and others like it may have in the field of teacher education. In the hands of the "wrong people" such information can have an impact which may be so negative that it would take years to undo, as in the case of studies which purport that a segment of our population is genetically inferior to other segments of the population.

It appears that the author has reviewed and analyzed the findings with complete objectivity. There appears to be no indication of any value judgements on the part of the writer. This must be emphasized because the study, taken out of context, or without a thorough analysis of each of the findings presented, can lead to erroneous concepts about students from a low socio-economic status (SES). Further, other factors which can be attributed to low SES should be carefully considered before drawing any conclusions from the study or the findings presented. These factors are the very essence of low SES--inadequate housing, medical facilities, poor nutrition, etc. Elaboration here hopefully is not necessary.

For specifics, one can look at a couple of the areas presented:

Organizing for Instruction

One may conclude that low SES students are unable to work independently - they lack discipline, cannot follow directions and must be guided step by step in their attempts to learn.

Quality of Instruction

One may conclude that low SES students are unable to respond to higher level questions - their innate ability is limited, they are "intellectually", whatever that means, inferior to high SES students. Moreover, low SES students don't ask questions and even when they do the "effective" teacher is not likely to respond to the student.

There are other areas from which negative conclusions can be drawn. What contributes to these conclusions is the fact that comparisons are made with high SES students. Why the negativeness? While not the majority, many low SES students in our society are the minorities - Black, Mexican American and Native American. There are cultural and language differences among these groups which are not often recognized as assets among the majority population; thus because of students' backgrounds, the quality of their education is affected.

Consider the instruments used by the researchers to measure teacher effectiveness. Do these tests take into consideration the cultural and language differences among a segment of the student population which is low SES?

In the hands of sensitive teacher educators, studies of this nature can be very useful in training teachers. These educators will recognize, analyze and present those causal factors underlying the differences in teaching low SES students and high SES students.

For those teacher educators who are insensitive, this study and others, taken out of context, can be damaging. Teachers trained by such people may exit the training program reviewing low SES students in a negative manner, and may teach in a manner which assumes that such students are limited in their ability to learn. It can lead to further segregation within the classroom.

Any study has the possibility of being misconstrued or misused. Thus it is crucial that to the extent possible any cautions or limitations of the study be in readers'/users' minds as they proceed. It is with this statement in mind that it is recommended that the sponsors of this compilation continue with the study.

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